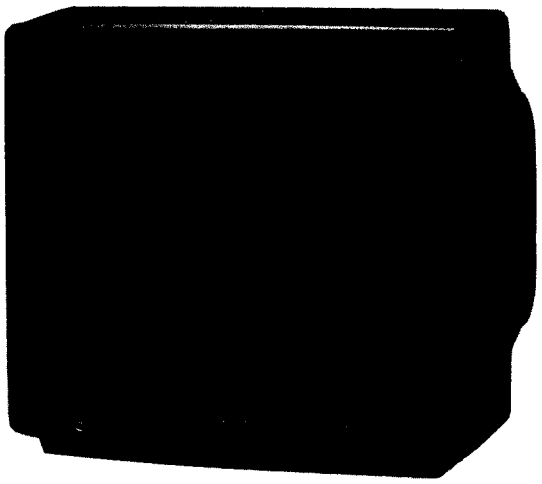
SERVICE DATA
FILE NO. 050-280
28-SYSTEM

TOSHIBA

COLOUR TELEVISION

219X9M



SPECIFICATIONS

Input Power Rating :	80 watts (nominal), AC110~245 volts, 50/60Hz
Aerial Input Impedance :	75 ohm unbalanced type VHF and UHF
Receiving Channels :	**PAL B/G, SECAM B/G system**
	VHF channels ..... channels 2 to 12
	UHF channels ..... channels 21 to 69
	PAL D/K, SECAM D/K, K1 system
	VHF channels ..... channels 1 to 12
	UHF channels ..... channels 21 to 69
	PAL I system
	UHF channels ..... channels 21 to 69
	NTSC standard (US M, JAPAN M) system
	VHF channels ..... channels 2 to 13/1 to 12
	UHF channels ..... channels 14 to 78/13 to 62
	CATV BAND
	PAL B/G, SECAM B/G ..... X ~ Z (S1 ~ S3), M1~M10(S1~S10), U1~U10(S11~S20)
	NTSC-M ..... A-6~A-1, A~I, J~W
Intermediate Frequencies :	Picture I-F carrier frequency ..... 38.0 MHz
	Sound I-F carrier frequency ..... 33.5/32.5/32.0/31.5 MHz
Picture Tube :	21 inches, A51KJV93X(VM) (51cm measured on diagonal of viewable picture area), 110° Deflection
Sound Output :	5 watts × 2
Speakers :	60mm × 120mm 2 pcs
Dimensions :	Height ..... 472 mm
	Width ..... 570 mm
	Depth ..... 480 mm
Weight :	22 kg
Features :	Clearness tube, VIDEO and AUDIO input/output terminals, S-VIDEO input terminals, Off/On timer, Remote Control

Specifications are subject to change without notice.

Printed in Japan Jan. 1990 (So)

SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" DESCRIBED BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 27.5kV at zero beam current (minimum brightness) under 110 ~ 245V AC power source. The high voltage must not, under any circumstances, exceed 27.5kV.
   Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure in this manual. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

SAFETY PRECAUTION

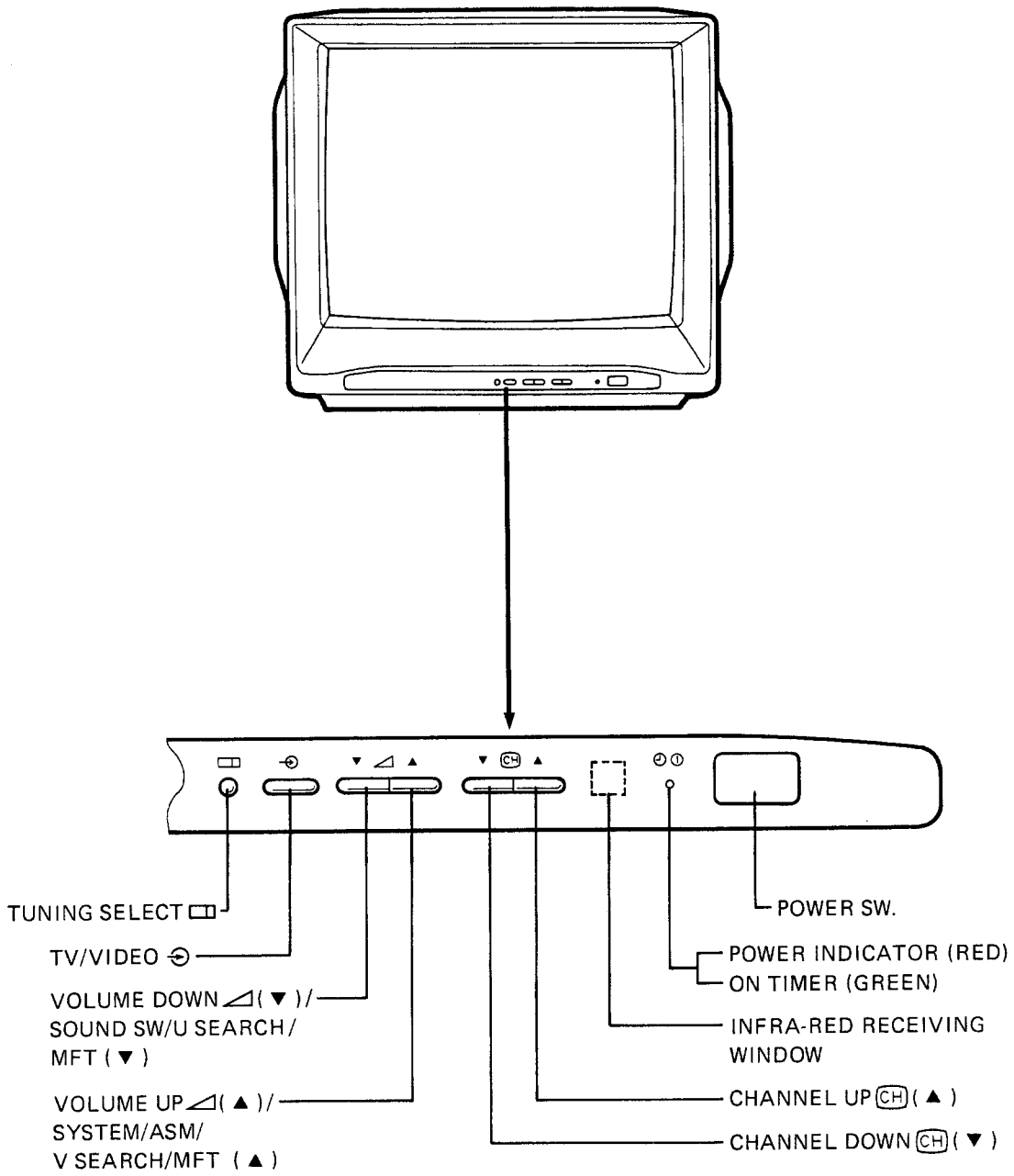
1. Potentials as high as 27kV are present when this receiver is operating. Operation of the receiver outside the cabinet or with back board removed involves a shock hazard from the receiver.
   1. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.
   2. Alway discharge the picture tube anode to the receiver chassis to keep off the shock hazard before removing the anode cap.
   3. Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the Fuse specified in the chassis parts list.
3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering.
4. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
5. Keep wires away from high voltage or high temperature components.
6. This receiver can be operated under AC 110 ~ 245 volts, 50/60Hz. NEVER connect to DC supply or any other power.

PRODUCT SAFETY NOTICE

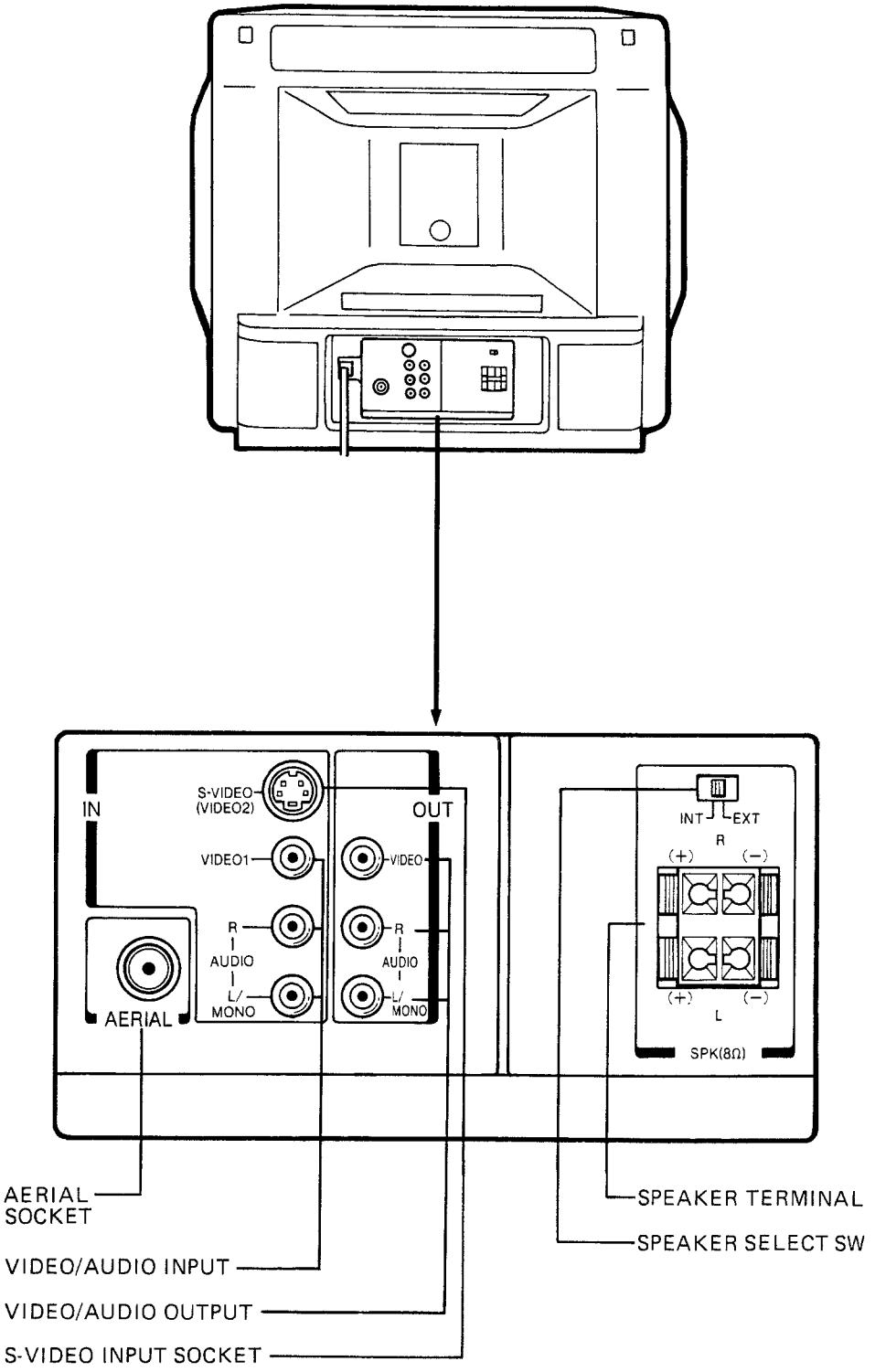
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by the international hazard symbols on the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION.

LOCATION OF CONTROLS

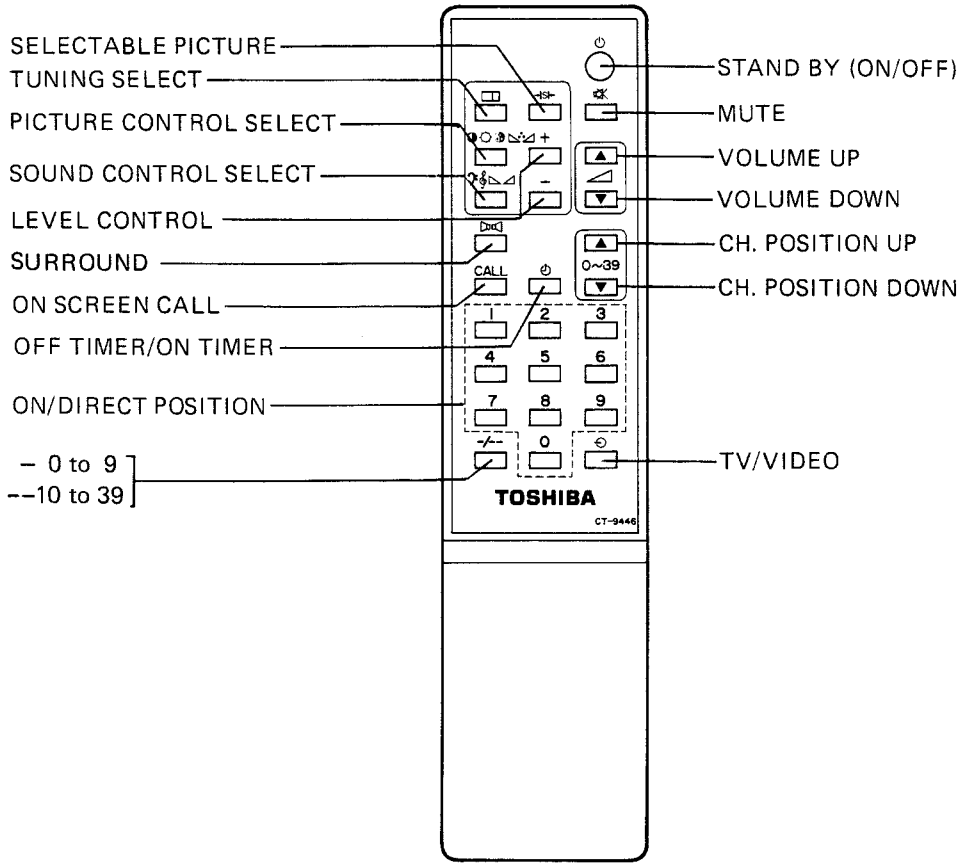
■ FRONT



■ BACK


IN
S-VIDEO (VIDEO2)
VIDEO1
R
AUDIO
L/MONO
AERIAL
OUT
VIDEO
R
AUDIO
L/MONO
INT
EXT
R
(+)
(−)
(+)
(−)
L
SPK(8Ω)
AERIAL SOCKET
VIDEO/AUDIO INPUT
VIDEO/AUDIO OUTPUT
S-VIDEO INPUT SOCKET
SPEAKER TERMINAL
SPEAKER SELECT SW

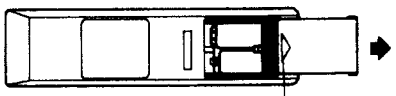
■ REMOTE CONTROL HAND UNIT



Before operating

INSTALLING THE BATTERIES

1. Remove the battery cover.
2. Insert the two "AA" (pencil size) 1.5V batteries making sure the polarity (+ or –) of the batteries matches the polarity marks inside the unit.
3. Close the battery cover.

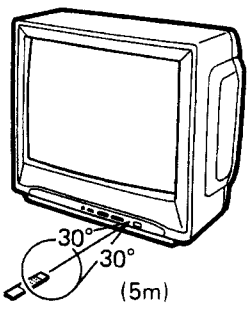


Press and slide to open.

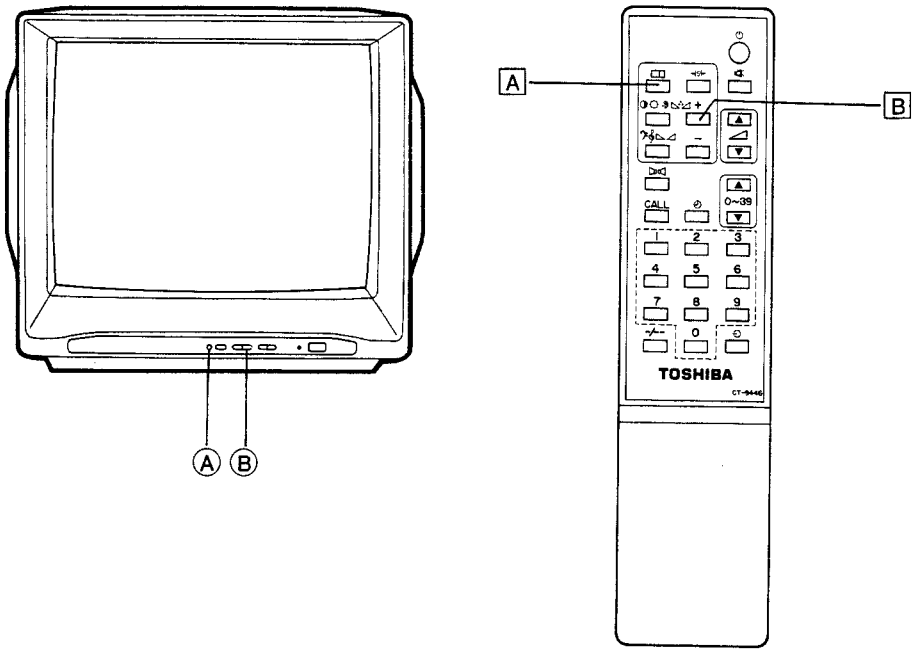
TIPS FOR REMOTE OPERATION

- If intermittent remote control operation occurs, replace the batteries according to "INSTALLING THE BATTERIES."
- The battery life should be about a year under normal use.
- When the Remote Control Hand Unit is not used for a long period of time or when the batteries are worn out, take out the batteries to prevent liquid leak.
- Do not throw the batteries into a fire. Dispose of used batteries in the specified places.
- Take care not to drop, dampen, disassemble the Remote Control Hand Unit.

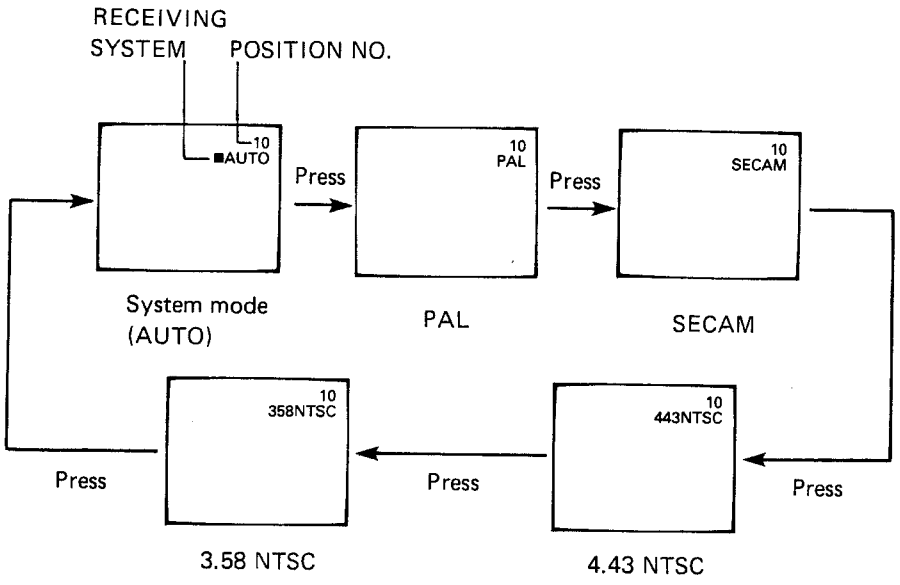
Effective Range



COLOUR SYSTEM SELECTION



1. Press the TUNING SELECT Button Ⓐ [A] to select the system mode. (AUTO mode)
2. Press the ▲ (+) of LEVEL Button Ⓑ [B] .
   One pressing shifts the system mode to next one as shown below.



RECEIVING SYSTEM

Receiving Systems	
28 System	Function
1. PAL B/G 2. PAL I 3. PAL D/K 4. SECAM B/G 5. SECAM D/K, K1 6. NTSC M	Reception of broadcast and playback for video cassette recorder
7. NTSC 4.43/5.5MHz 8. NTSC 4.43/6.0MHz 9. NTSC 4.43/6.5MHz 10. NTSC 3.58/5.5MHz 11. NTSC 3.58/6.0MHz 12. NTSC 3.58/6.5MHz 13. SECAM I (6.0MHz) 14. SECAM L-Video In 15. S-VIDEO IN PAL 16. S-VIDEO IN SECAM 17. S-VIDEO IN SECAM-L 18. S-VIDEO IN 4.43NTSC 19. S-VIDEO IN 3.58NTSC 20. VIDEO IN 50/60 21. S-VIDEO IN 50/60	Playback for special video cassette recorder
22. NTSC 3.58/4.5MHz/50Hz 23. PAL 5.5MHz/60Hz 24. PAL 6.0MHz/60Hz 25. PAL 6.5MHz/60Hz 26. SECAM 5.5MHz/60Hz 27. SECAM 6.0MHz/60Hz 28. SECAM 6.5MHz/60Hz	Playback for special video disk, CDV player

- **AUTO** All signals of 28 systems can be received.
- **PAL** PAL Signal can be received.
- **SECAM** SECAM Signal can be received.
- **443NTSC** Signal from VCR on 4.43NTSC can be received.
- **358NTSC** 3.58NTSC signal can be received. U.S. CHANNEL, JAPAN CHANNEL (PHILIPPINES, KOREA)

Receiving channels

- Regular TV VHF BAND
  2 – 12 (PAL/SECAM – B)
  1 – 12 (PAL/SECAM – D)
  2 – 9 (SECAM – K1)
  2 – 13 (NTSC – M) US
  1 – 12 (NTSC – M) JAPAN
- Regular TV UHF BAND
  21 – 69 (PAL/SECAM – G, PAL I)
  21 – 69 (SECAM – K)
  13 – 56 (PAL – K)
  14 – 78 (NTSC – M) US
  13 – 62 (NTSC – M) JAPAN
- CATV BAND
  X ~ Z (S01~S03)
  M1 ~ M10 (S1-S10) (PAL/SECAM – B, G)
  U1 ~ U10 (S11-S20)
  A-6 ~ A-1
  A ~ 1 (NTSC – M)
  J ~ W

■ COUNTERMEASURES AGAINST MALFUNCTION IN FRINGE AREA

1. In Case Abnormal Signals Were Memoried by Auto Search

If you mind this, reset the memory by MFT (Manual Fine Tuning) from the position after the one where the abnormal signals were memorized.

2. System Selection When System Malfunction Occurs

System malfunction may occur in auto maode when unfavourable receiving conditions prevail. In this event, use manual mode which matches the system of receiving signals.

Example:
(1) In the case of receiving successive channels.
(2) In using video tape reproduced repeatedly.
(3) When receiving different systems in the vicinity of border where receiving conditions are bad.
(4) In the area where strong and week electric fields are mixed in the channels.

TV PROGRAM RECEPTION

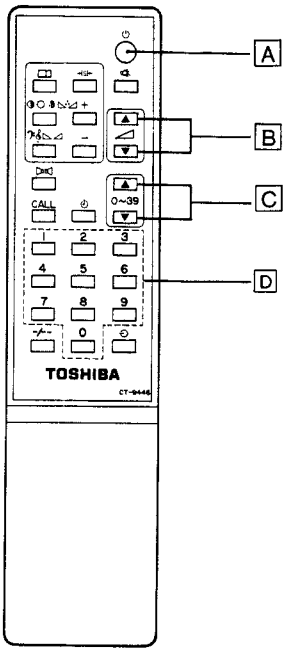
■ WHEN USING REMOTE CONTROL HAND UNIT

SET UP

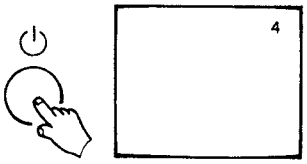
Press the switch: Indicater lamp (RED) will be lit and the TV set is ready for viewing.

To turn off the TV: Press the button again.

- Once the MAIN ON/OFF switch is turned on, you can remote-control the TV set.
- If the TV turned off by pressing the MAIN ON/OFF switch on the TV set, it will be turned "on" by pressing the MAIN ON/OFF switch only.



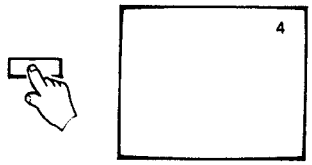
1 **The TV set is turned on and off by pressing the ON/OFF button [A]. Also it is turned "on" directly by pressing the POSITION buttons [D].**



Press the button: The TV set will be turned "on" and the picture of previously viewed the channel is seen.

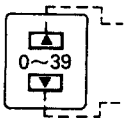
To turn off the TV: Press the button again.

2 **Channel is turned by pressing the CHANNEL button [D].**



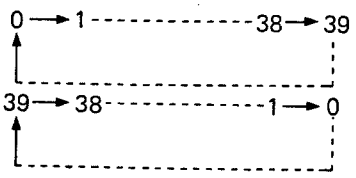
The picture will be changed over, and you will have the position No. displayed on the screen for a few seconds.

- Channel change can be performed by CHANNEL buttons [C] as well.

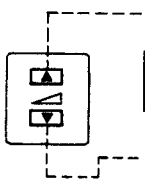


Change will take place in the direction from 0 to 39.

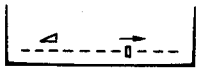
Change will take place in the direction from 39 to 0.



3 **Sound volume is adjusted by VOLUME buttons [B]**

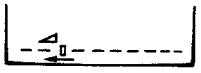


Sound becomes larger



Green square shifts rightwards, and the sound becomes larger.

Sound becomes smaller



Green square shifts leftwards, and the sound becomes smaller.

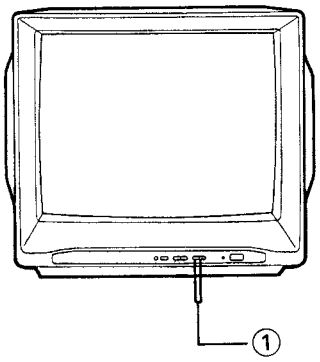
■ CONTROLLING THE TV SET PROPER

- In case the Remote Control Hand Unit is not near at hand, or batteries have been used up, you can control the TV on the receiver proper.

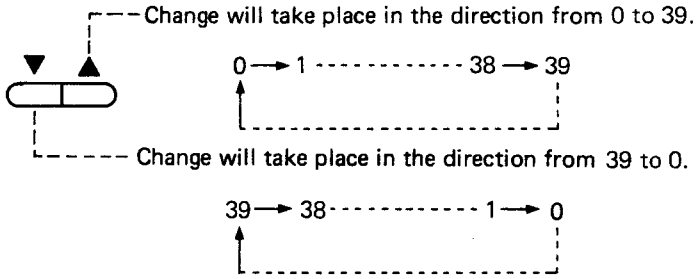
1 **The TV set is turned on and off by operating the MAIN ON/OFF switch.**

Press it: The TV set is turned on.
To turn off: Press the switch again.

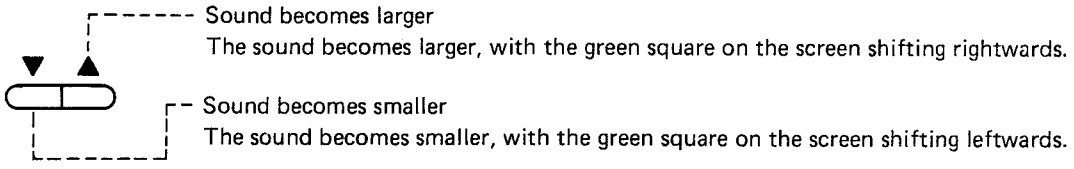
Note: When the TV set is not turned on with the MAIN ON/OFF switch pressed, press the CHANNEL buttons ①.



2 **Channel is tuned by the CHANNEL buttons.**



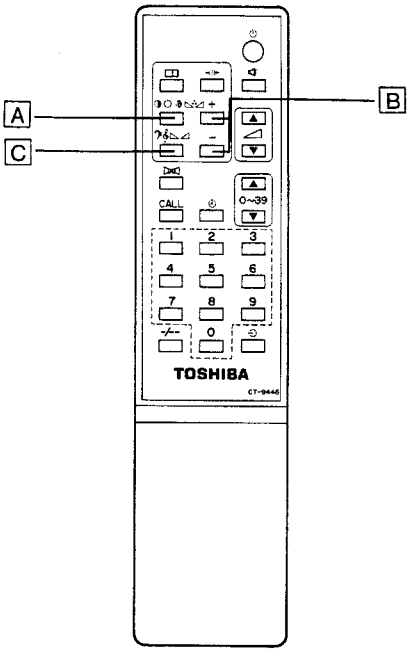
3 **Sound volume is adjusted by VOLUME buttons.**



Notes:

- In operating the Remote Control Hand Unit, direct it toward the receiving section of the receiver.
- Even if power is turned off by pressing the POWER button on the Remote Control Hand Unit, a trace of electric current stays flowing in the TV set. If television is not viewed for a long time, turn off the MAIN ON/OFF switch. When going out, take out the power plug from the wall outlet.

PICTURE AND SOUND CONTROLS

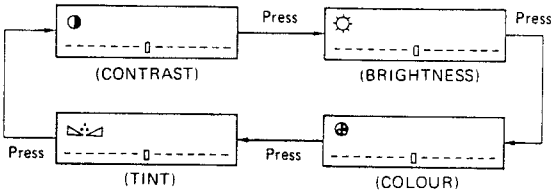


■ PICTURE CONTROL

(CONTRAST, BRIGHTNESS, COLOUR, TINT)

To adjust picture for your preference, first select a function by the PICTURE Button [A] ,then adjust the level by the LEVEL Buttons [B] .

PICTURE CONTROL INDICATION



- **FUNCTION SELECT**

  Press the PICTURE Button [A] to select a function to be adjusted among CONTRAST, BRIGHTNESS, COLOUR, TINT. One pressing shifts the function to the next one.

- **LEVEL ADJUSTMENT**

1. After the function selection above, immediately (within 4 seconds) press the ▲ (+) ▼ (−) Button of LEVEL Buttons [B]
   Press continuously to shift the level to the next step, and release the button at your preferred picture.
   The LEVEL Buttons are effective only during the selected function is displayed.
2. Above display will disappear if no additional pressing of CONTROL or LEVEL (▲ / ▼) Button is done within 4 seconds.
3. The last adjusted value will be stored into memory when LEVEL (▲ or ▼) Button is released.
4. Adjustment steps and indication:
   Each function can be adjusted with 32 steps and it's approx. adjusted value is displayed with 15 steps.

	FUNCTION	ON-SCREEN ADJUSTMENT DISPLAY	
		Green guide line	
		CONTROL DOWN ▼ Button (The green square moves left)	CONTROL UP ▲ Button (The green square moves right)
PICTURE CONTROL Button	CONTRAST	Weak	Strong
	BRIGHTNESS	Dark	Light
	COLOUR	Pale	Deep
	TINT	Purplish	Greenish

■ SOUND CONTROL

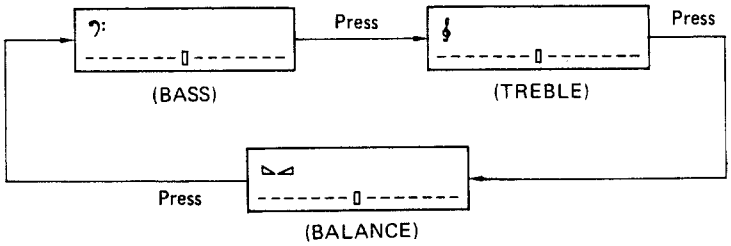
(BASS, TREBLE, BALANCE)

To adjust sound for your preference, first select a function by the SOUND Button [C] , then adjust the level by the LEVEL Buttons [B] .

- **FUNCTION SELECT**

  Press the SOUND Button [C] to select a function to be adjusted among BASS, TREBLE, BALANCE. One pressing shifts the function to the next one as shown below.

SOUND CONTROL INDICATION

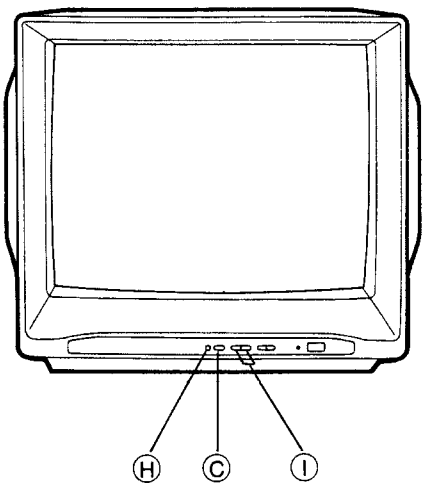


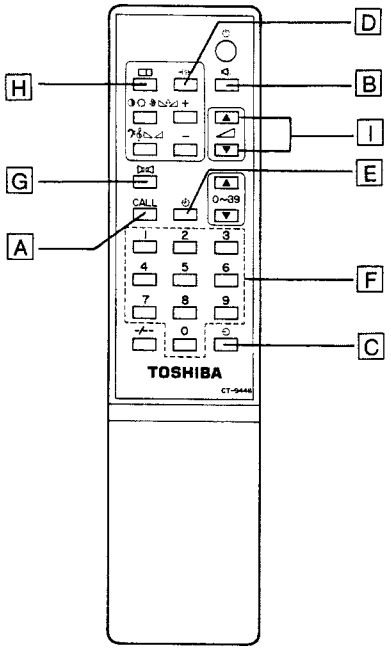
- **LEVEL ADJUSTMENT**

1. After the function selection above, immediately (within 4 seconds) press the ▲ (+) or ▼ (−) Button of LEVEL Buttons [B] .
   Press continuously to shift the level to the next step, and release the button at your preferred sound.
   The LEVEL Buttons are effective only during the selected function is displayed.
2. Above display will disappear if no additional pressing of CONTROL or LEVEL (▲ / ▼) Button is done within 4 seconds.
3. The last adjusted value will be stored into memory when LEVEL (▲ / ▼) Button is released.
4. Adjustment steps and indication:
   Each function can be adjusted with 32 steps and it's adjusted approx. value is displayed with 15 steps.

	FUNCTION	ON-SCREEN ADJUSTMENT DISPLAY	
		Green guide line	
		CONTROL DOWN ▼ Button (The green square moves left)	CONTROL UP ▲ Button (The green square moves right)
SOUND CONTROL Button	BASS	Low tones are weakened	Low tones are enhanced
	TREBLE	High tones are weakened	High tones are enhanced
	BALANCE	Lowers sound from the right speaker	Lowers sound from the left speaker

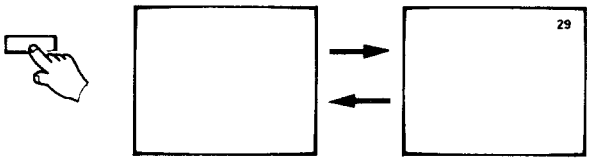
AUXILIARY FUNCTIONS





1 CALL SWITCH button

- The display and erasure will alternate each time the CALL button [A] is pressed.

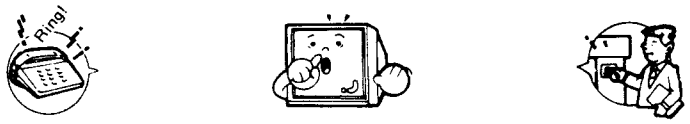


■ **Displays on the screen:**

2 MUTE

■ **This feature is useful:**

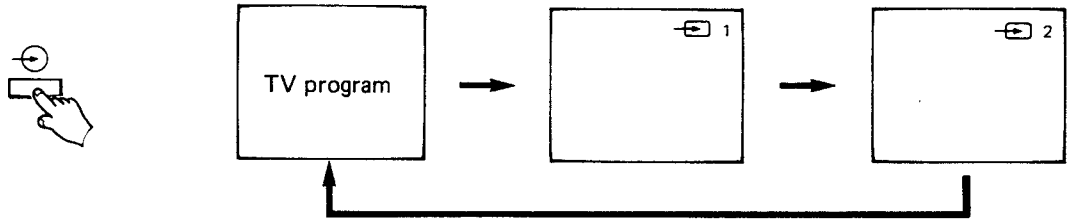
During phone call. Be silent! When receiving a visitor.



- The sound mute and restoration will alternate each time the MUTE button [B] is pressed.

3 TV/VIDEO SW

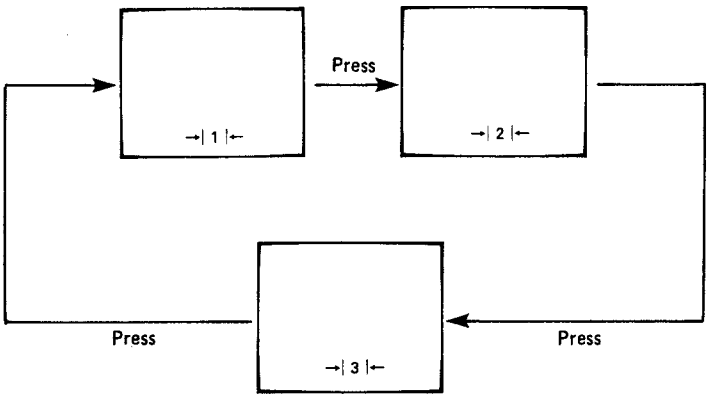
- Each time the video button Ⓒ[C] is pressed, selection will be changed over in sequence.
- The VIDEO button on the TV set operates in the same way.



- If you press the CHANNEL button (0 to 39), the channel is changed over to the selected one.

4 SELECTABLE PICTURE

The SELECTABLE PICTURE (→|S|←) Button [D] changes the level corresponding to picture control function (CONTRAST, BRIGHTNESS and COLOUR) to three kinds of fixed values. You may select desired patterns of picture.



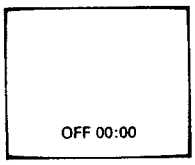
5 ON/OFF TIMER

This feature can turn ON/OFF the TV set automatically in a minute unit during 12 hours as you desire, and the ON TIMER can also set the POS numbers.

(1) OFF TIMER

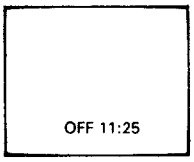
Example: Set OFF at 11 hours 25 minutes later.

1. Press the ON/OFF TIMER button [E].



2. Using the Number Key [F], input the set time.

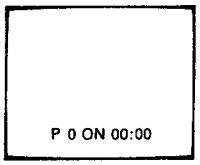
	OFF TIMER
Input 1	OFF 1-:--
Input 1	OFF 11:--
Input 2	OFF 11:2-
Input 5	OFF 11:25



(2) ON TIMER

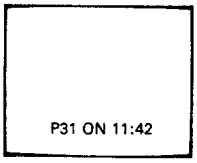
Example: Set ON at 31 position 11 hours 42 minutes later.

1. Press the ON/OFF TIMER button [E] twice to select ON TIME MODE.



2. Using the [F] key, input the set position and time.

	P 0 ON00:00
Input 3	P3- ON--:--
Input 1	P31 ON--:--
Input 1	P31 ON1-:--
Input 1	P31 ON11:--
Input 4	P31 ON11:4-
Input 2	P31 ON11:42

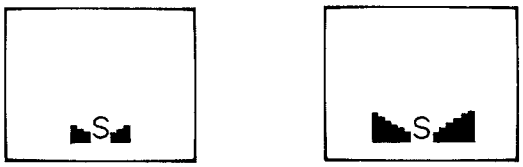


Caution:

1. When nothing inputs for 4 seconds, setting of ON TIMER/OFF TIMER is cancelled.
2. The display indicates rest time every 1 minute unit.
3. It is impossible to input a digital exceeding 12:00 or a digital of which POS number exceeds 39.
4. If the MAIN power is turned off or 4 digits of 0 are input, the setting will be cancelled.
5. Indicator lamp (GREEN) will be lit during ON TIMER operating.

6 SIMPLIFIED SURROUND

Press the SURROUND button [G].
The effect of spreading sound is turned on by pressing this button.

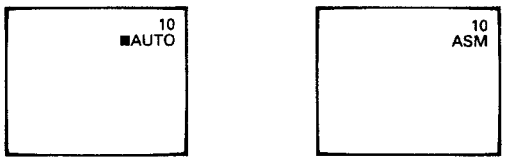


SURROUND OFF　　SURROUND ON

7 SOUND SW

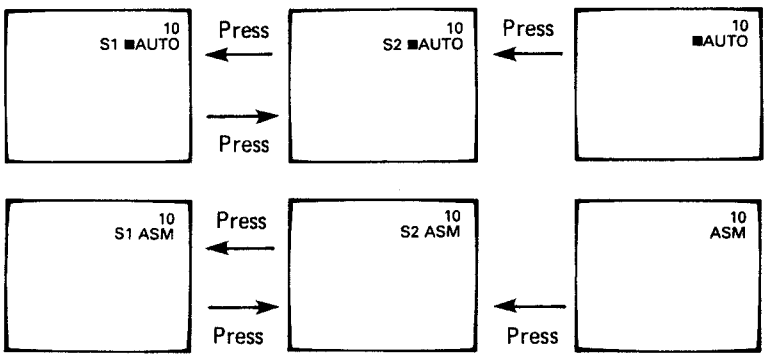
Sound Disturbance Protective Switch at broadcasting of NICAM Multi-Sound-System and CATV (B/G System)
However, the other systems unless mentioned above shall be used in the NORMAL mode.

(1) Press the TUNING SELECT Button Ⓗ [H] to select the system mode or ASM mode.



System Mode　　ASM Mode

(2) Press the ▼ (–) of LEVEL Button Ⓘ [I], and change the mode into the cyclic mode as shown

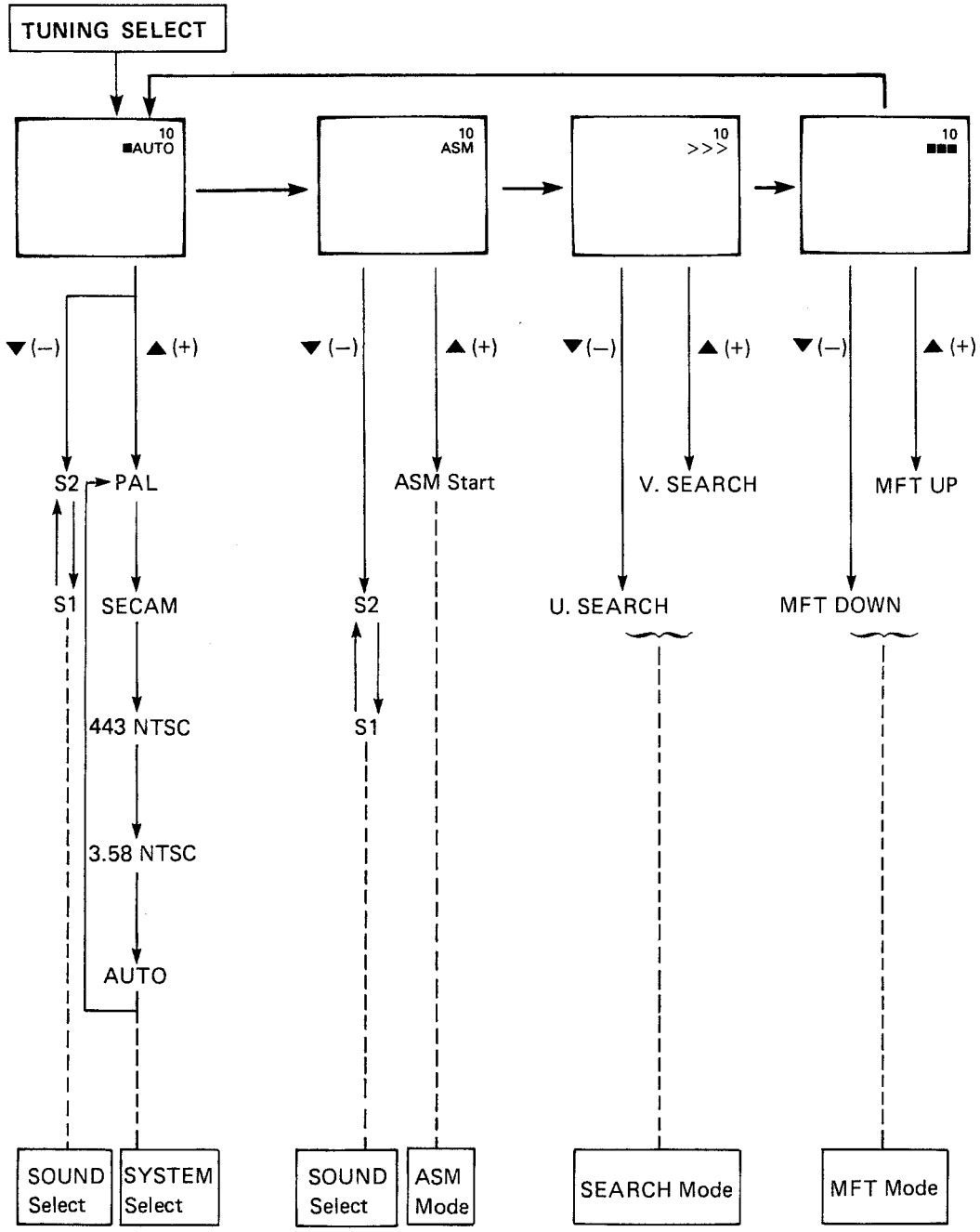


Normal Mode　　Sound Disturbance Protective Mode　　Normal Mode

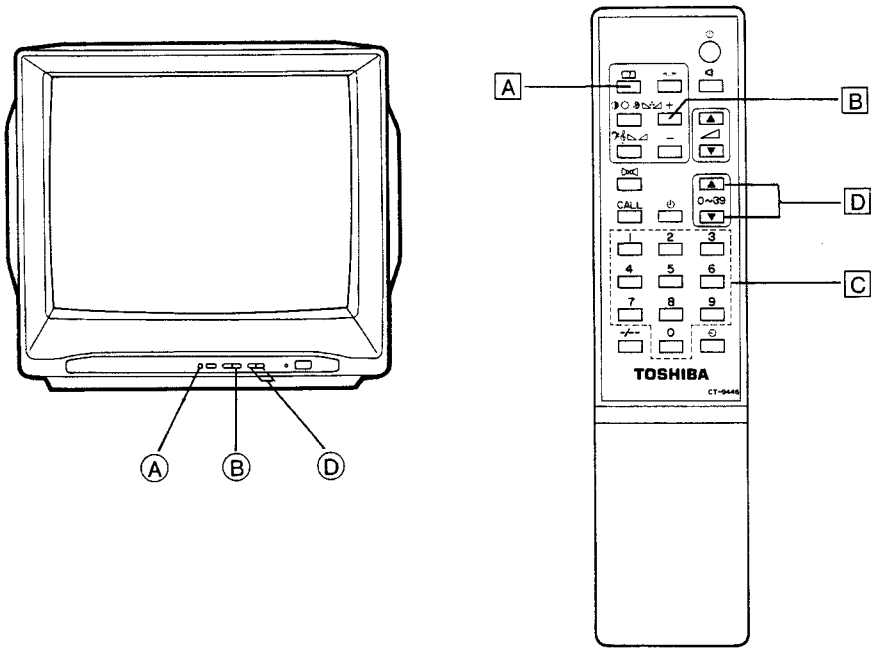
Caution:
4 seconds later, the display can disappear.

8 TUNING SELECT

Change-over of the system, selection and operation of tuning method.



CHANNEL MEMORIZATION



This TV receiver can memorize 40 channels of station on the desired position number, 3 ways of channel memorization are prepared; namely ASM, U/V SEARCH and MFT.

[1] TO MEMORIZE ALL CHANNELS IN SEQUENCE AUTOMATICALLY

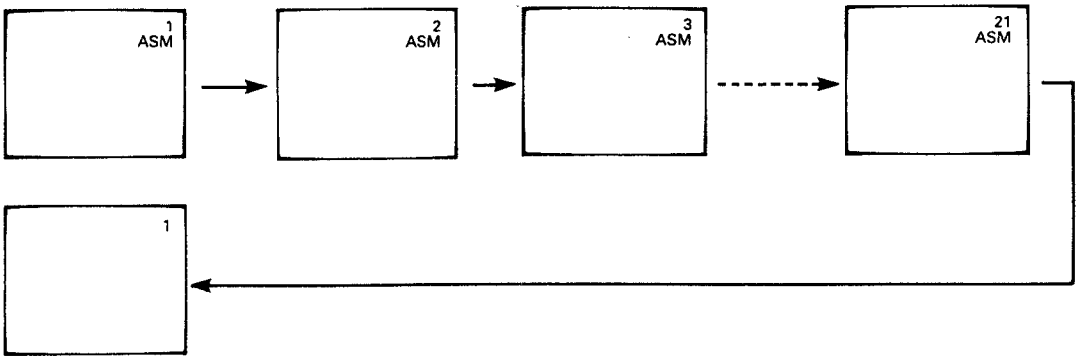
ASM: Free position Auto Search Memory

For example, to memorize channels from the position 1 automatically:

(1) Select the position 1 with the DIRECT POSITION Button [C] on remote hand unit or the CHANNEL UP/DOWN Button Ⓓ [D] on TV receiver.

(2) Press the TUNING SELECT Button Ⓐ [A] to select the ASM mode.

(3) Press the ▲ (+) of LEVEL Button Ⓑ [B] , and all active channels (stations) in your area are automatically memorized on the positions from smaller number to large one in sequence.
During the operation of AUTO SEARCH MEMORY, "ASM" are indicated with flickering in 0.2 seconds interval.



(4) After all channels are memorized, the search goes to the position 20 and returns to the position 1 to end the operation.

(5) When you desire to memorize the same contents to the position 21 and large, sefect the position 21 and repeat adjustment steps (2) and (3) as mentioned above. After the channels are memorized, the search goes to the position 29 and returns to the position 21 to end the operation.

2 TO MEMORIZE THE DESIRED CHANNEL ON A CERTAIN POSITION

V/U SEARCH

For example: The channel 3 on the position 3

(1) Select the position 3 with the DIRECT POSITION Button C on the remote hand unit or the CHANNEL UP/DOWN Button Ⓓ D on the TV.

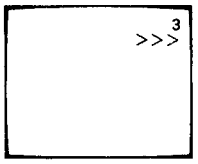
(2) Press the TUNING SELECT Button Ⓐ A to select the SEARCH mode.

(3) Press the ▲(+) of LEVEL Button Ⓑ B.
Search begins on the channel 3.

(4) Press repeatedly ▲ (+) of LEVEL Button Ⓑ B until the desired position 3 is received on the screen.

(5) When you desire to memorize the UHF channels, in the above procedure, press ▼(−) of LEVEL Button Ⓑ B together.

(6) During the search operation, ">>>" is indicated with flickering in 0.2 seconds interval.
When the search reaches to the lowest frequency of TV VHF/UHF band, the search stops and ">>>" will be indicated with flickering in 1.0 second interval.
In this case, press the ▲ (+) or ▼ (−) of LEVEL Button again to restart the search operation.

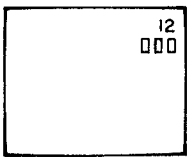


3 FINE TUNING

If the receiving condition in your area is poor, the detuning adjustment may be recommended for better viewing with the FINE TUNING Button.

Note: In the fine tuning mode, receiving picture may deviate slightly, because the automatic frequency control is deactivated.
At that time, readjust the fine tuning to correct the deviation.

(1) Select the TUNING SELECT Button Ⓐ A to select the MFT mode.
"□□□" is indicated under the position number display.

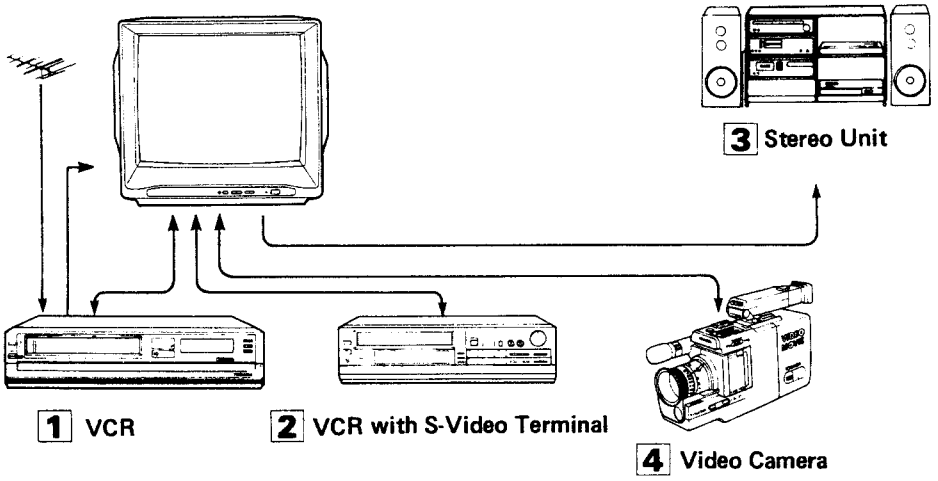


(2) Press the ▲ (+) or ▼ (−) of LEVEL Button to adjust the picture for better one.

(3) The fine tuning mode is released with the POSITION Button, TV/VIDEO Button or POWER ON/OFF Button pressed.

EXTERNAL EQUIPMENT CONNECTIONS

Equipment connectable (This TV is provided with jacks for connecting several appliances)



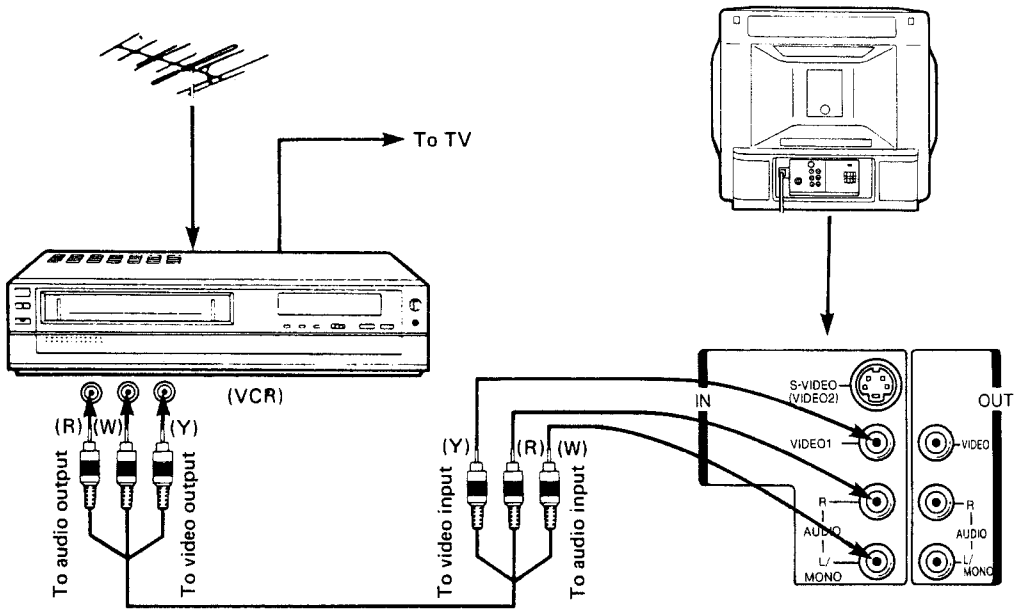
- This TV receiver is equipped with video input and output terminals for 1 system, audio output terminal and S-video input terminal for your entertainment in combination with various appliances.
- Apart from the above, such appliances as video disk, BS tuner, and video outputting MSX personal computer can be connected to the video input terminals of this TV set.

Note: The video input terminal can not input simultaneously VCR, VCR with S-video terminal, video camera for the reason of 1 system.

1 TO CONNECT VCR FOR PICTURE RECORDING AND PLAY-BACK

- The connecting method illustrated below is for enjoying recording and play-back TV program, while monitoring it. Background TV program can be recorded as well.

HOW TO CONNECT VCR



HOW TO USE

When recording	When playing back
1 Select the TV program to be recorded on the side of VCR to put it in the recording position. 2 To monitor the recording condition, put the TV set in "VIDEO 1" mode by pressing VIDEO button on the TV.	1 Get into "VIDEO 1" mode by pressing VIDEO button on the TV set. 2 Set VCR in the play-back position. **Note:** To view a TV program after play-back, put it in the "TV" position by pressing the TV/VIDEO button.

To record background TV program

1 Set the VCR in the recording position by taking the steps as mentioned in the above "When recording."

2 Press the TV/VIDEO SELECTION button of VCR to put it into "TV" mode.

3 You may view TV program as you like by pressing CHANNEL button of the TV.

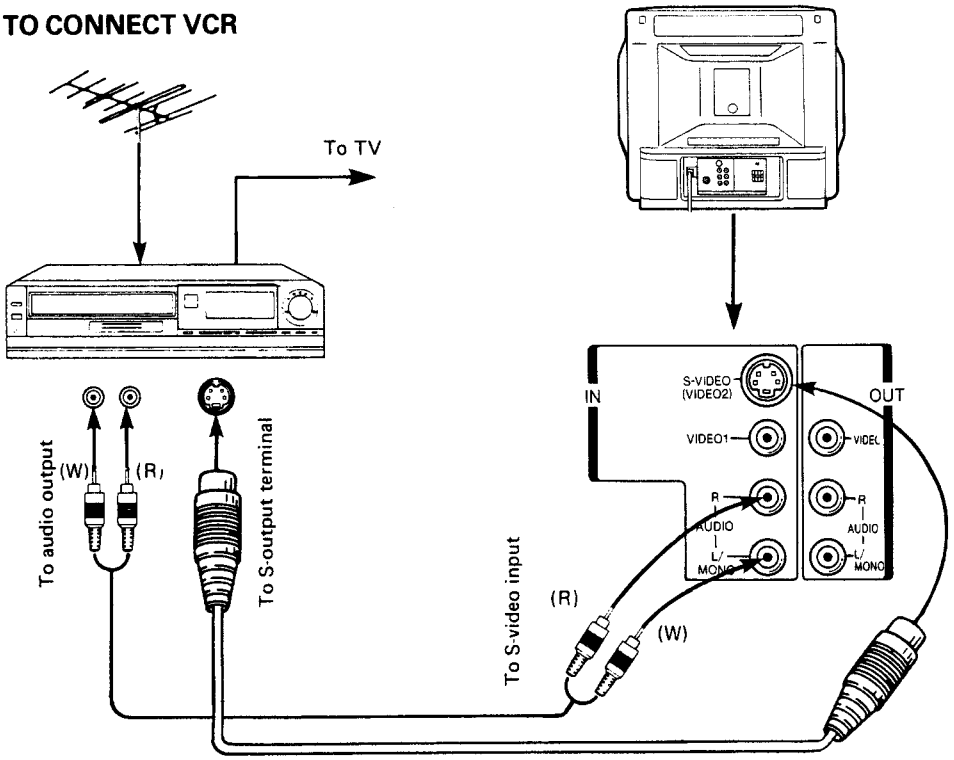
NOTE:

- Be sure to read the "Operation Manual " of the VCR you use as well.
- It is operable also with the video input terminal.
- When viewing TV program with the connection exemplified above (connection through VCR to antenna lead-in), turn off the power of VCR or press TV/VIDEO button to get into the "TV" mode.

2 WHEN CONNECTING VCR PROVIDED WITH S-VIDEO TERMINAL

- High quality picture can be viewed by connecting VCR provided with S-video terminal.

HOW TO CONNECT VCR



When recording	When playing back
1 Select the TV program to be recorded on the side of VCR to put it in the recording position. 2 To monitor the recording condition, put the TV set in "VIDEO 2" mode by pressing VIDEO button on the TV.	1 Get into "VIDEO 2" mode by pressing VIDEO button on the TV set. 2 Set VCR in the play-back position. **Note:** To view a TV program after play-back, put it in the "TV" position by pressing the TV/VIDEO button.

To record background TV program

1 Set the VCR in the recording position by taking the steps as mentioned in the above "When recording."
2 Press the TV/VIDEO SELECTION button of VCR to put it into "TV" mode.
3 You may view TV program as you like by pressing CHANNEL button of the TV.

NOTE:

- This connecting arrangement is confined to the VCR with S-video terminal. For VCRs in general, use the connection as illustrated in the preceeding page.
- S-video terminal is a separate TC signal terminal.
- Do not use the video terminal of the video input (VIDEO INPUT 1) terminal concurrently with the S-video input terminal.
- Use audio terminal of the video terminal of the video input (VIDEO INPUT 1).
- Be sure to read the "Operation Manual " of the VCR you use as well.

BELL COIL (LM01) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the synchroscope to the terminal Pin 2 of LM01.
3. Adjust LM01 for the flat level of amplitude in each colour bar waveform on the scope. (See figure 1.)

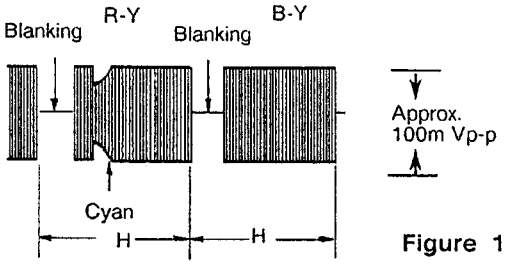


Figure 1.

IDENT COIL (LM04) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the DC voltmeter (Digital Voltmeter) to the pin 23 of IC501.
3. Adjust LM04 for the maximum indication (approx. DC10V) on the meter.

B-Y, R-Y DEMOD COIL (LM02, LM03) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Set the COLOUR, BRIGHTNESS and CONTRAST Controls free.
3. Connect the synchroscope to the pin 62 of IC501.
4. Adjust LM02 so that the white level in picture part reaches to the vertical retrace line. (See figure 2.)
5. Then change the connection of synchroscope from the pin 62 to the pin 60 of IC501.
6. Adjust LM03 so that the white level in picture part reaches to the vertical retrace line. (See figure 3.)

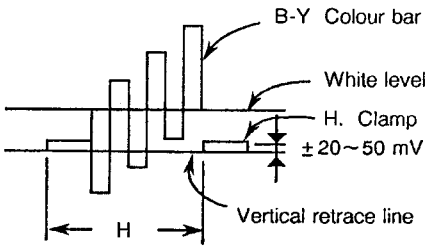


Figure 2.

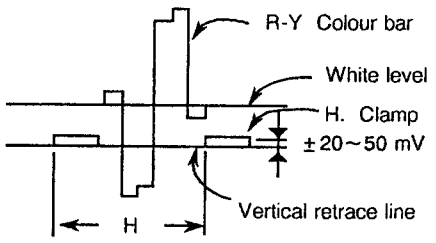


Figure 3.

PAL MATRIX ADJUSTMENT

1. Tune in the colour programme PAL Philips pattern.
2. Set the COLOUR Control VR. to obtain the proper colour.
3. If the PAL MATRIX adjustment is in correct, the venetian Blind would appear in the colour bars area. The case needs the adjustment.
4. At the first, adjust DL PHASE ADJ. Coil (L551) to minimize the Venetian Blind.
5. Next adjust 1H-DL ADJ. VR (R551) to minimize the Blind.
6. Remove the capacitor, and if the Venetian Blind still remains, adjust 1H-DL PHASE ADJ. Coil (L551) to minimize the Blind again.
7. Repeat the item 5 and 6 procedures, adjust the R551 and L551 until the Blind does not appear when the capacitor is connected.

SIF DET. ADJUSTMENT L651 FOR 6.0MHz

1. Supply +12V to the System Switch Board.
2. Connect 10k ohm resistor between pin 18 of IC670 and ground.
3. Supply +3V DC to terminal "TP-14" on PIF/SIF Board through 100 ohm resistor.
4. Connect the 6.0MHz signal (Modulation: 400Hz/15kHz deviation, 100dBμ) of SIF S.G. to pin 16 of IC101 through a capacitor 0.01μF.
5. Connect the millivoltmeter to pin 11 of IC101.
6. Adjust L651 for the maximum reading on the meter.

CN52 FOR 4.5MHz

1. Supply +12V to the System Switch Board.
2. Connect 10k ohm resistor between pins 18 and 22 of IC670.
3. Supply +3V DC to terminal "TP-14" on PIF/SIF Board to deactivate PIF circuit.
4. Connect the 4.5MHz signal (Modulation: 400Hz/ 7.5kHz deviation, 100dBμ) of SIF S.G. to pin 16 of IC101 through a capacitor 0.01μF.
5. Connect the millivoltmeter to pin 11 of IC101.
6. Adjust the variable capacitor (CN52) for the maximum reading on the meter.

SIF DET. ADJUSTMENT 6.0MHz OSC. COIL (L672)

1. Supply +12V to the System SW. Board.
2. Connect 10k ohm resistor between pin 18 of IC670 and ground.
3. Apply the 6.0MHz signal (No modulation, 100dBμ) of SIF S.G. to Base of QN40 through a capacitor 0.01μF.
4. Connect oscilloscope to pin 9 of ICS01.
5. Adjust L672 so that the response on oscilloscope can be maximum.

SIF DET. ADJUSTMENT 5.5MHz OSC. COIL (L671)

1. Supply +12V to the SYSTEM SW. Board.
2. Supply +9V to Anode of D340 through 10k ohm resistor.
3. Apply the 5.5MHz signal (No modulation, 100dBμ) of SIF S.G. to pin 27 of IC670 through a capacitor 0.01μF.
4. Connect oscilloscope or DC voltmeter to pin 18 of IC670.
5. Adjust L671 so that the response on oscilloscope or DC voltmeter can become +4.5V.

COLOUR PURITY ADJUSTMENT

Note : Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes. Purity adjustment requires Rubber Wedge kit.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Turn the CONTRAST and BRIGHTNESS Controls to maximum.
3. Adjust RED and BLUE CUT OFF controls (R557 and R559) to provide only a green raster. Advance the GREEN CUT OFF control (R558) if necessary.
4. Loosen the clamp screw holding the yoke, and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 5) around the neck of the picture tube until a green belt is obtained in the centre of the screen. And at the same time, centre the raster vertically by adjusting the magnet.
7. Move the yoke slowly forward or backward until a uniform green screen is obtained. Tighten the clamp screw.
8. Check the purity of the red and blue raster by adjusting the CUT OFF Controls.
9. Tighten the clamp screw of the yoke temporarily.
10. Obtain a white raster, referring to "CRT GREY SCALE ADJUSTMENT".
11. Proceed with convergence adjustment.

CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Turn the SCREEN Control (on T461) fully counter-clockwise.
3. By rotating the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559), clockwise from the minimum, set then to the mid position.
4. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the mid position.
5. Set the SERVICE SW. (S202) in the H. line position.
6. Short temporarily Terminal P590 on the CRT DRIVE Board.
7. Set the CONTRAST, COLOUR Controls to minimum and BRIGHTNESS Control to centre position.
8. Rotate the SCREEN Control gradually clockwise until the first line appears slightly on the screen. Then turn fully counterclockwise the two CUT OFF Controls corresponding to the colours of the first and the second horizontal lines to eliminate the lines.
9. Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen.
   Set the SCREEN Control to this position.
   At the base of the colour, rotate the remaining two CUT OFF Controls gradually clockwise until the horizintal lines of each colour appear slightly on the screen.
10. Open the termianl P590 on the CRT DRIVE Board.
11. Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE).
    The lines may lock like white if the CUT OFF Controls are adjusted properly.
12. Return the SERVICE SW. (S202) in the Receiving position.
13. Set the BRIGHTNESS Control to the maximum and COLOUR Control to the minimum.

SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme.
2. Set the CONTRAST Control to the maximum and the BRIGHTNESS Control to the centre.
3. Set the COLOUR Control to the centre.
4. Set the SUB-BRIGHT. Control (R255) to the centre and leave the receiver for five minutes in this state.
5. Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
6. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

CONVERGENCE ADJUSTMENTS

Note : Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

■ Centre Convergence Adjustment

1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 5.) and superimpose red and blue vertical lines in the centre area of the picture screen. (See figure 6.)
4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 6.)
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 with understanding red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual affection and it makes dots movement complex.

■ Circumference Convergence Adjustment

1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Put a wedge as shown in figure 4. temporalily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 6.) Push the mounted wedge into the space between picture tube and yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 6.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick 3 adhesive tapes on wedges.

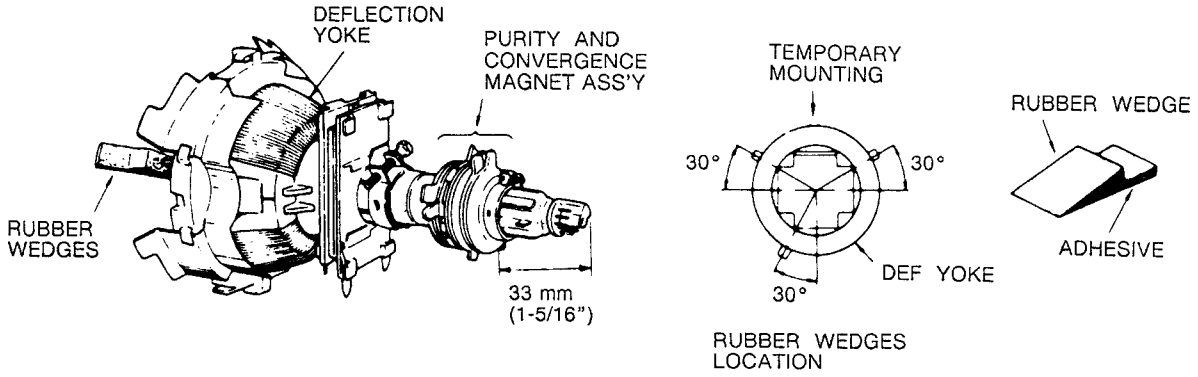


Figure 4.

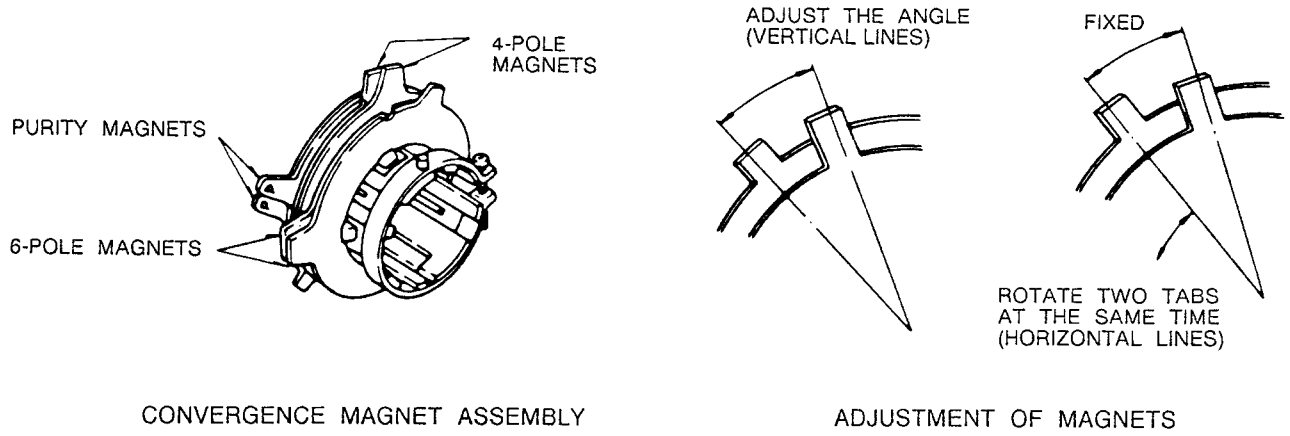


Figure 5.

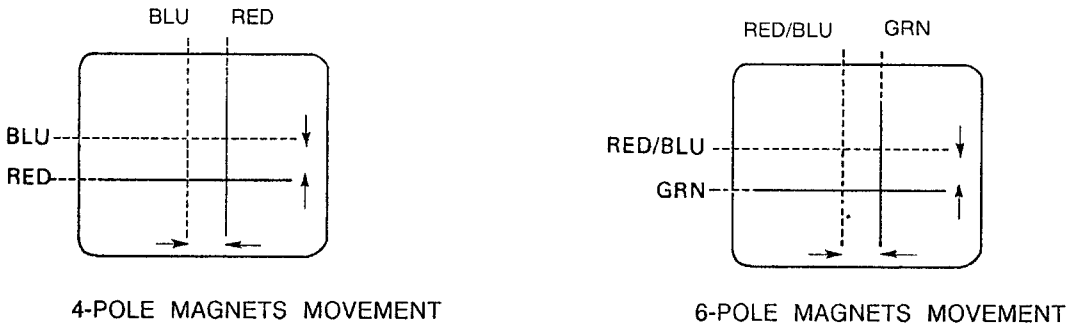


Figure 6. Dot Movement Pattern.

PICTURE I-F TRAP ALIGNMENT

NOTE ..... Perform this adjustment prior to I-F SWEEP and AFC ALIGNMENTS.
GENERAL ..... Refer to Figure 7 for the equipment connection.
PRELIMINARY STEPS .....
1. Disconnect the jumper wire 036 (see Figure 7) on the component side of the MAIN Board.
2. Supply +12 volts to the pin 1 of P101 on the IF Board.
3. Supply +8 volts bias to the pin 1 of IC101 on the IF Board.
4. Turn AGC DELAY Control (R151) on the IF Board fully clockwise.

SWEEP/MARKER GENERATOR..... Connect to the point ⓓ as shown in Figure 10 on the IF Board.
OSCILLOSCOPE..... Connect through the detector (See Figure 9.) to the collector of Q161 on the IF board.

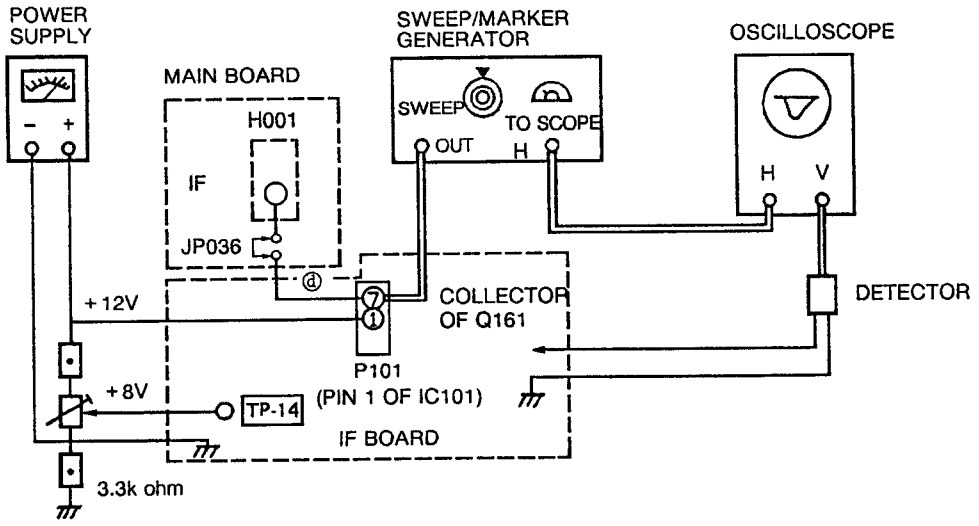


Figure 7. Picture IF Sweep Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	PROCEDURE
TN01 33.5 MHz/TN02 32.0 MHz TRAP ALIGNMENT Control the sweep output for easy alignment. Set the system SW to 3.58 NTSC system.			
4.5 MHz Trap Coil	33.5MHz Marker "ON"	TN01	• Set the IF Marker for 33.5 MHz (P-4.5M) • Adjust TN01 so that 33.5 MHz marker point is placed at bottom of response. (See Figure 8)
6.0 MHz Trap Coil	32.0MHz Marker "ON"	TN02	• Set the IF Marker for 32.0 MHz (P-6.0M) • Adjust TN02 so that 32.0 MHz marker point is placed at bottom of response. (See Figure 8)

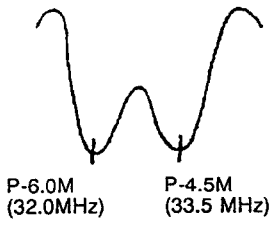


Figure 8. Trap Response

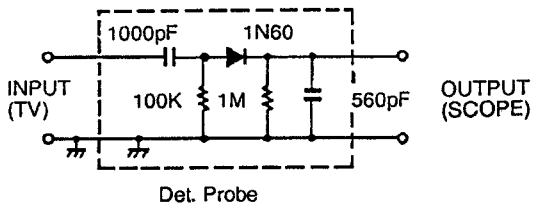


Figure 9. Detector Diagram

PICTURE I-F SWEEP ALIGNMENT

GENERAL..... Refer to Figure 10 for test equipment connection.

PRELIMINARY STEPS ..... 1. Disconnect the jumper wire 036 (see Figure 10.) on the component side of the MAIN Board.
2. Supply +12 volts to the IF Board.
3. Supply adjustable bias to the pin 1 of IC101 on the IF Board.
4. Turn AGC DELAY Control (R151) on the IF Board fully clockwise.

SWEEP/MARKER GENERATOR..... Connect to the point ⓓ as shown in Figure 10 on the IF Board.
Signal: IF Sweep 70~80 dB

OSCILLOSCOPE..... Connect through the resistor 100 kohm to the pin 18 of IC101 on the IF Board.

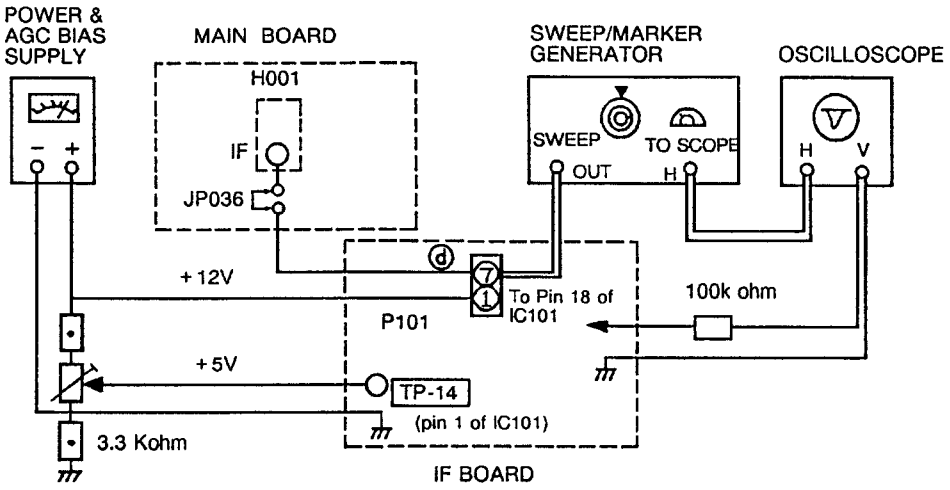


Figure 10. Picture IF Sweep Alignment

STEP	SWEEP/MARGER GENERATOR	ADJUST	REMARKS
L151 ALIGNMENT Control the sweep output for easy alignment			
Detector Coil (L151)	38.0 MHz Marker "ON"	L151	• Adjust L151 so that 38.0 MHz marker point is placed at the minimum of response (See Figure 11.)
After completing the above steps, disconnect the equipment and re-solder the solder links. Switch on the receiver, and adjust the AGC Delay control (R151) following DELAYED R-F AGC ADJUSTMENTS.			

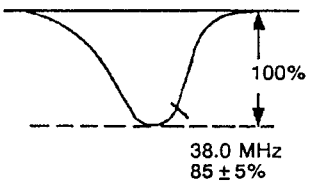


Figure 11.

AFC ALIGNMENT

GENERAL ..... Refer to Figure 12 for test equipment connection.

PRELIMINARY STEPS .....
1. Disconnect the jumper wire 036 (see Figure 12.) on the component side of the MAIN Board.
2. Supply +12 volts to the IF Board.
3. Turn AGC DELAY Control (R151) on the IF Board fully clockwise.
4. No external bias supply is required.

DVM ..... Connect to pin 6 of P101 and ground.

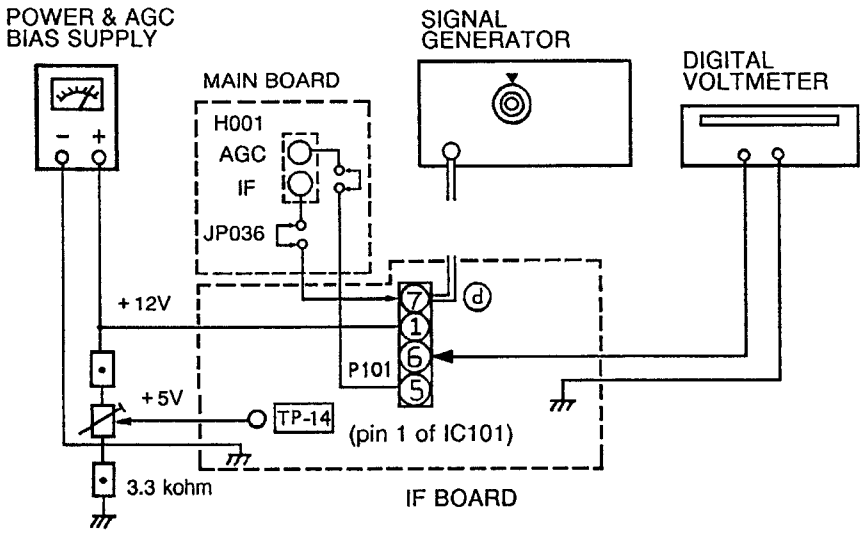


Figure 12. Picture IF Sweep Alignment

STEP	SIGNAL GENERATOR	ADJUST	REMARKS
1. AFC Balance	NO SIGNAL	R152	• Short the pin 1 of IC101 to ground. • Adjust R152 for ±0.2V at pin 6 of P101. • After the adjustment, remove the shorting at pin 1 of IC101.
2. AFC Detector	38.0 MHz CARRIER WAVE 70 ~ 80 dB	L152	• Connect IF carrier wave (60 dBμs or more) to the point ⓓ in Figure 12. • Adjust L152 for 2.5±0.5V at pin 6 of P101.
After completing the above steps, disconnect the equipment and re-solder the solder links. Check AFC operation is normal. Readjust AGC DELAY control (R151) following DELAYED R-F AGC ADJUSTMENTS.			

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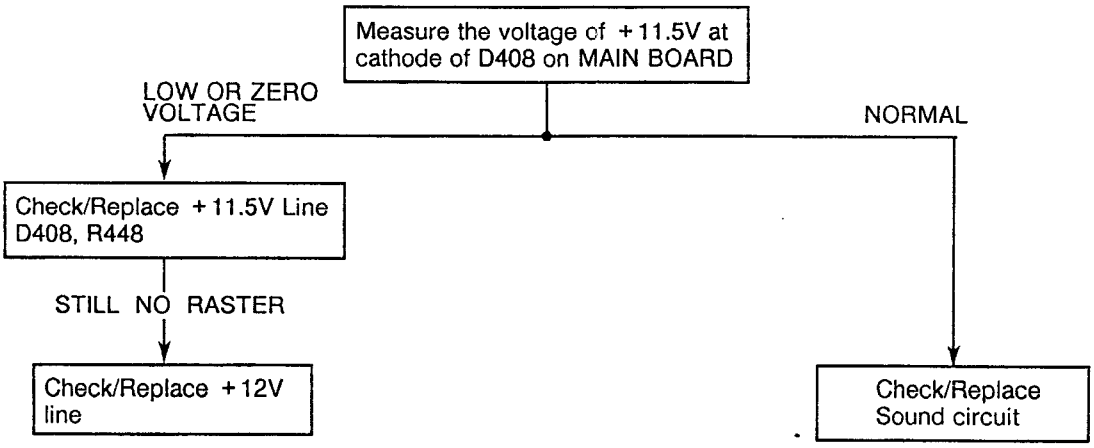
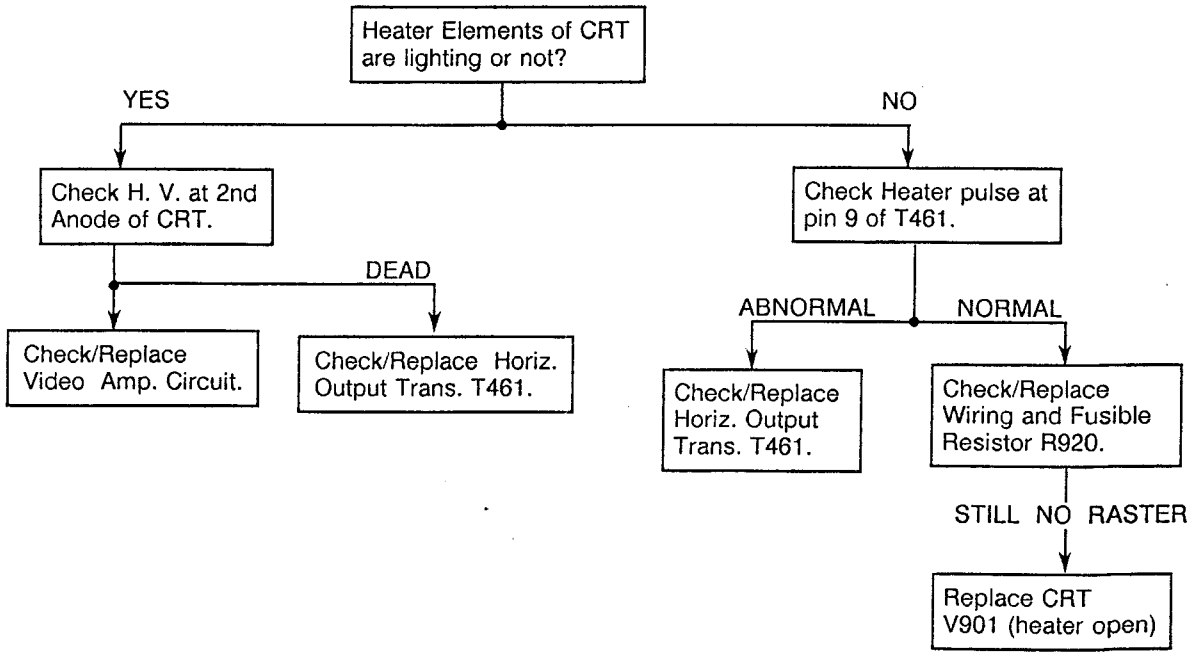
2. NO RASTER (NOISE OR WEAK SOUND)

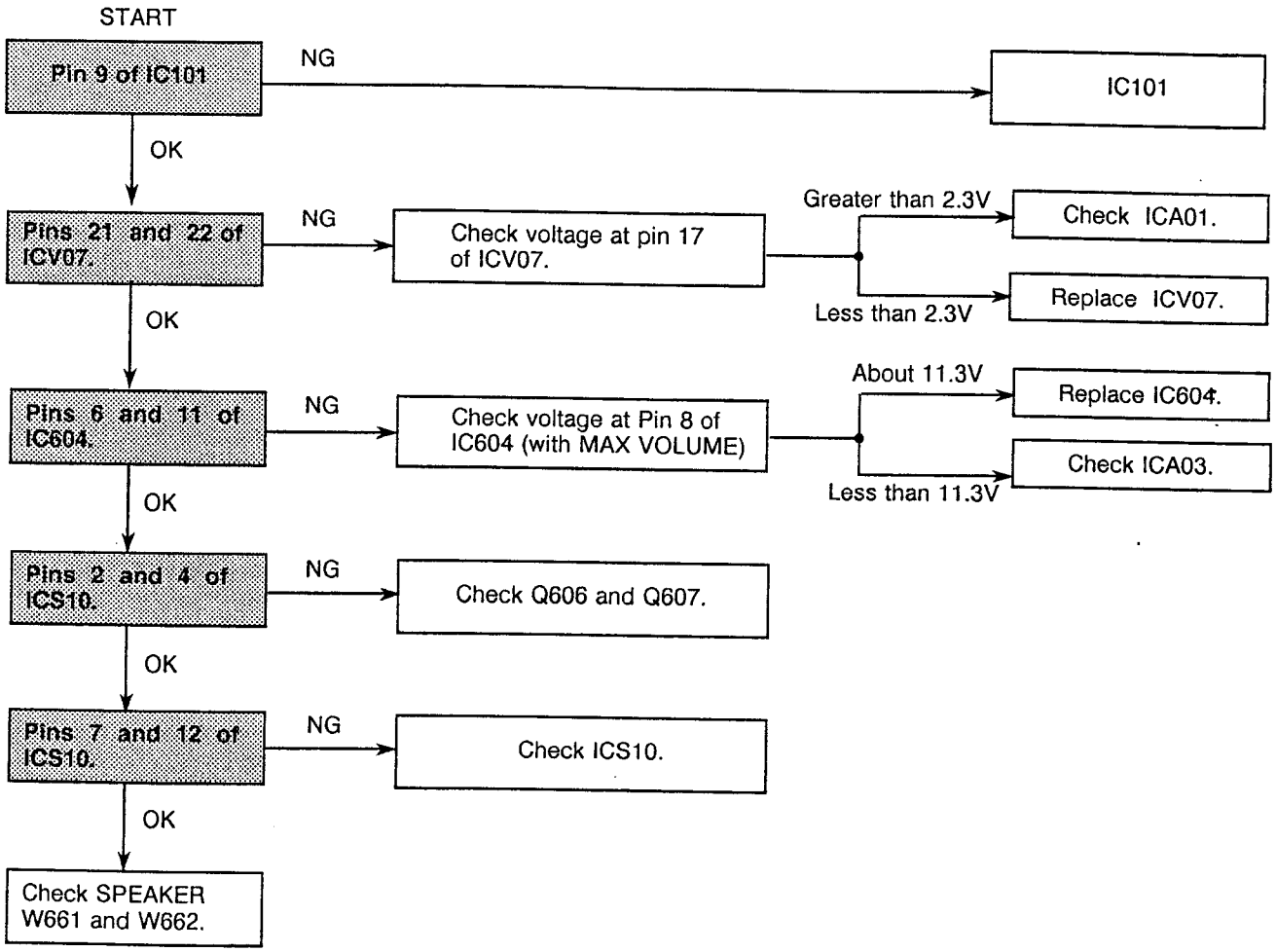


3. NO RASTER (SOUND OK)



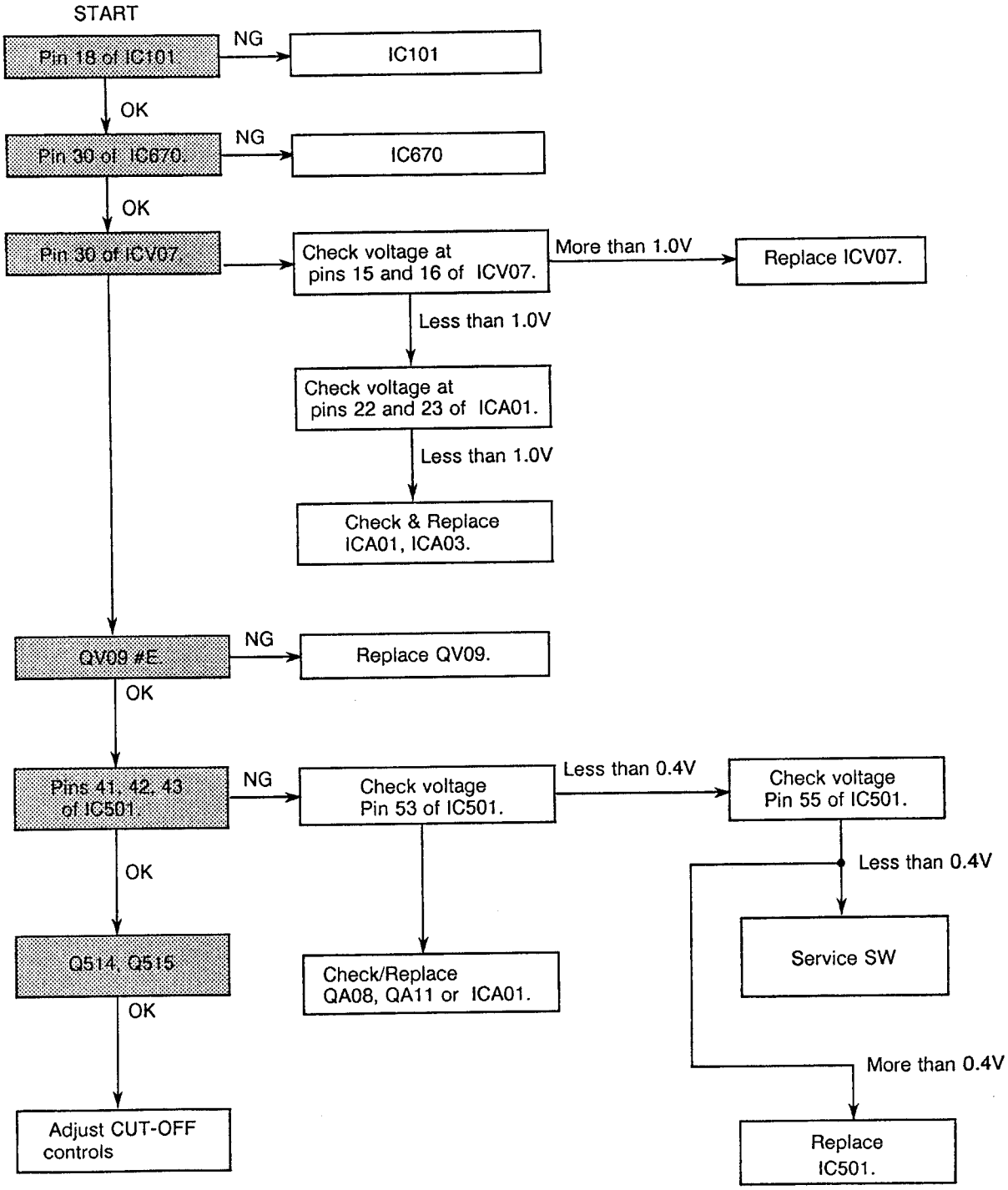
4. NO SOUND

NOTE: Check the sound signal waveform for shaded area below.



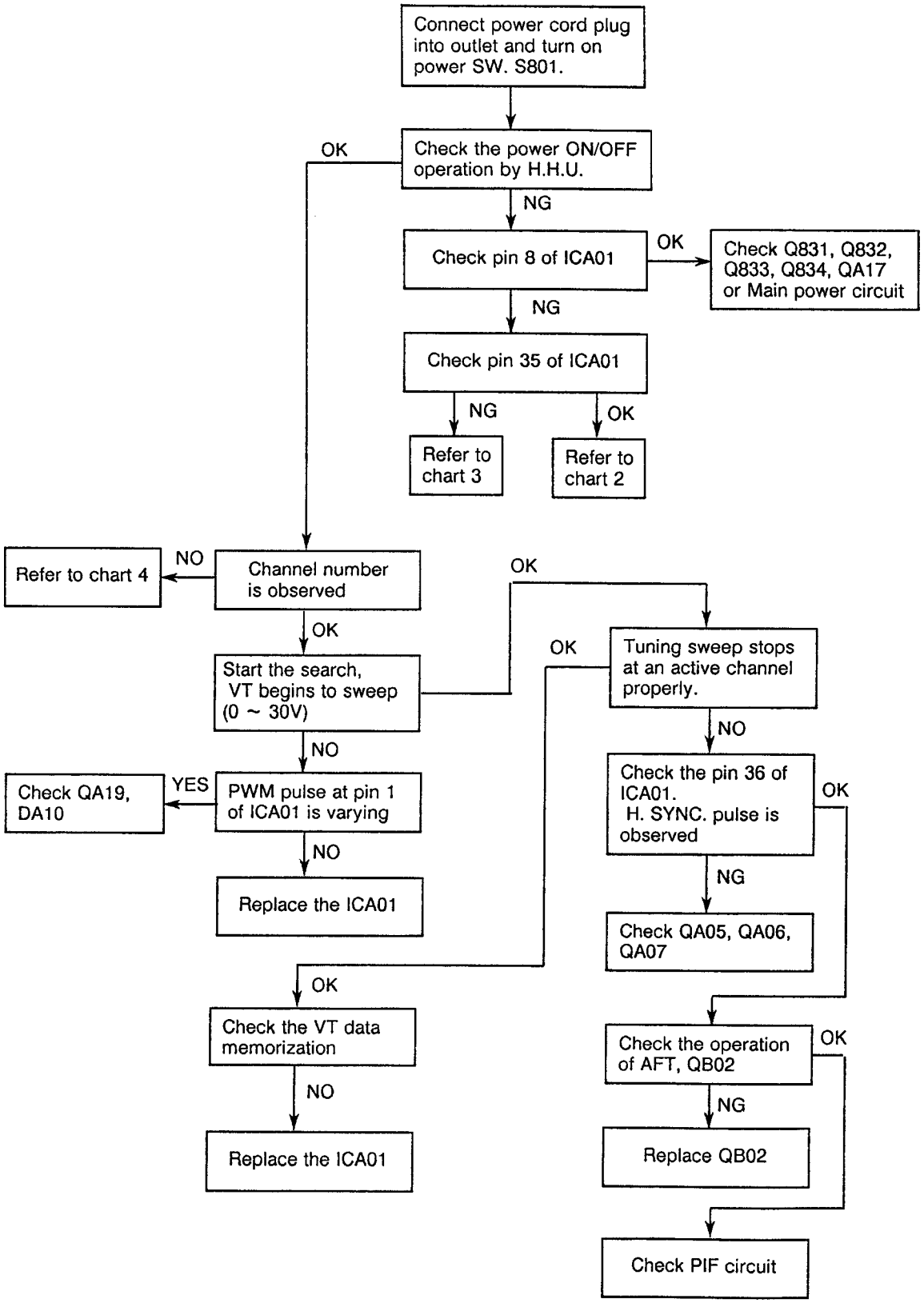
5. NO PICTURE

Check video signal waveform for shaded area below.



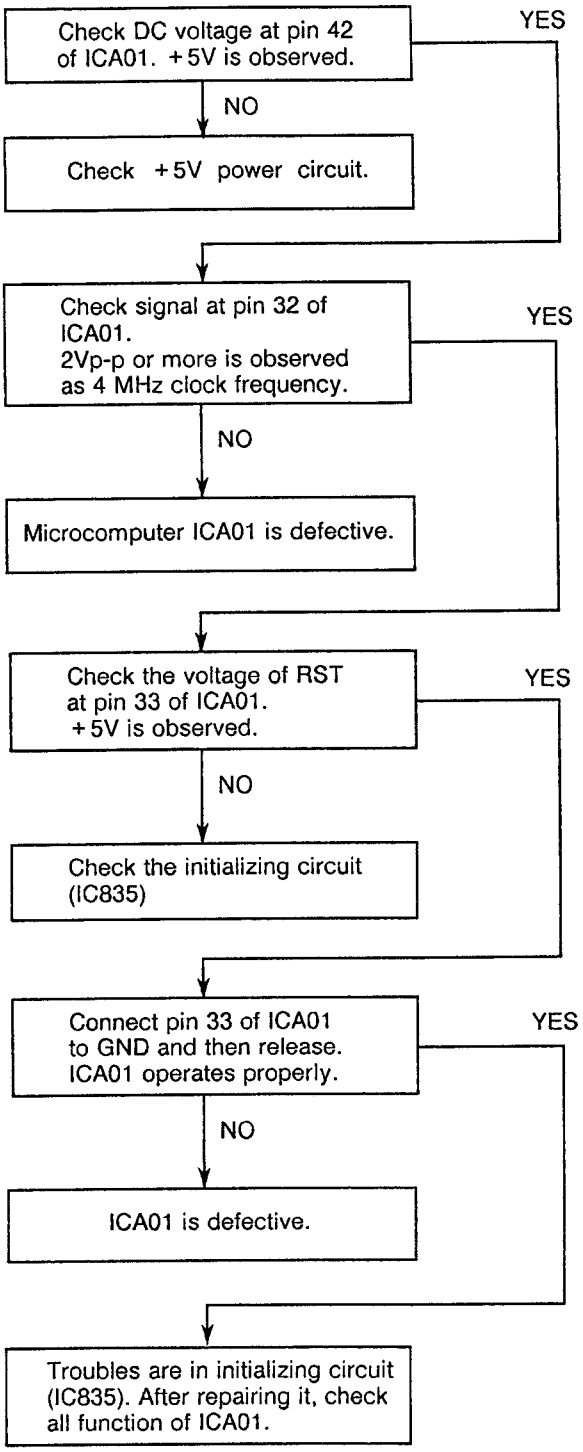
6. CHANNEL SELECTOR TROUBLE

[CHART 1]



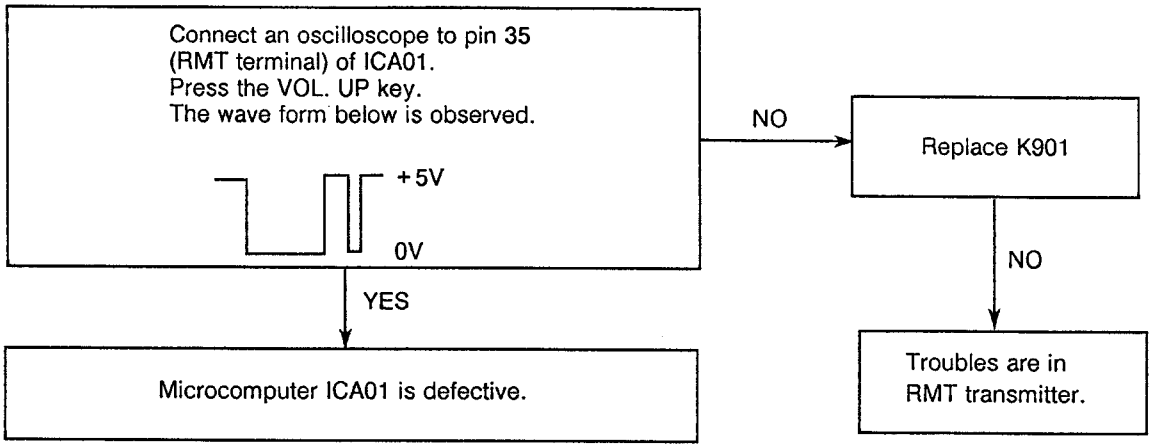
[CHART 2] Microcomputer (ICA01) Operation Check

NOTE: Before checking Microcomputer, check that control buttons and their connection work properly.

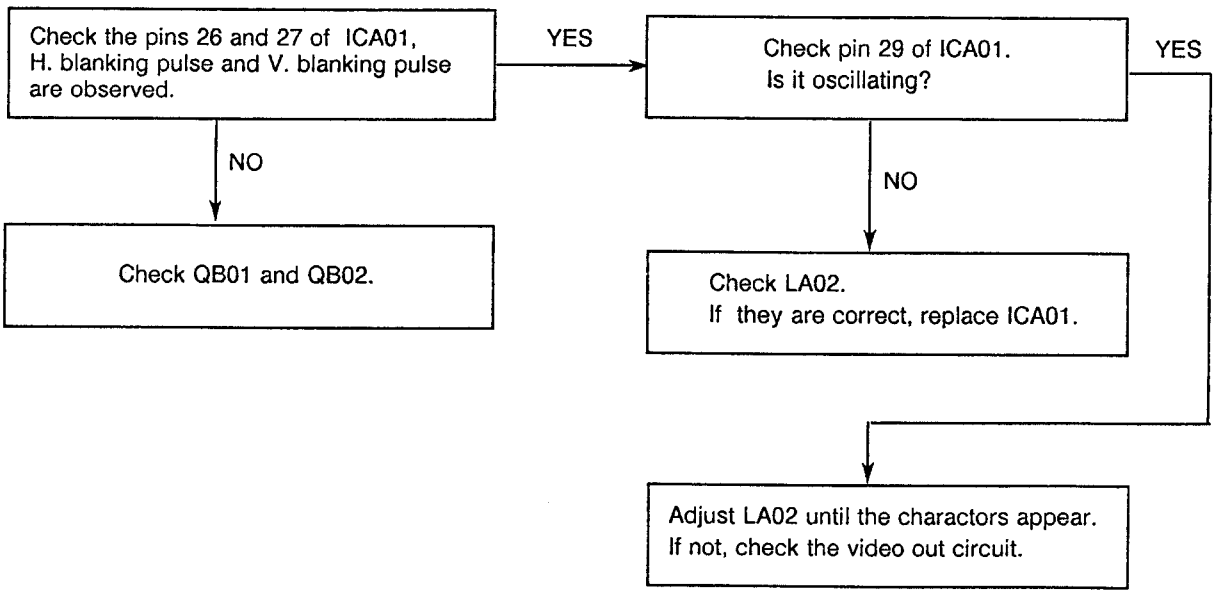


[CHART 3] Remote Control Operation Check

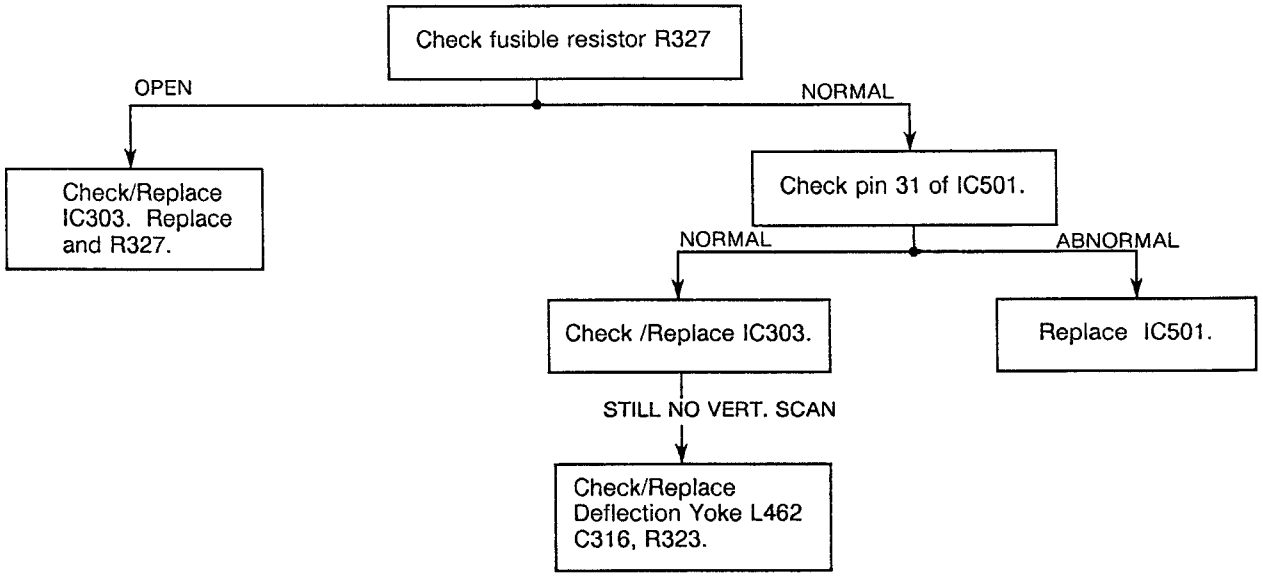
NOTE : Before checking RMT operation, check that key operation on TV set is proper.



[CHART 4] On Screen Display Operation Check



7. NO VERT. SCAN (ONE HORIZ. LINE RASTER)



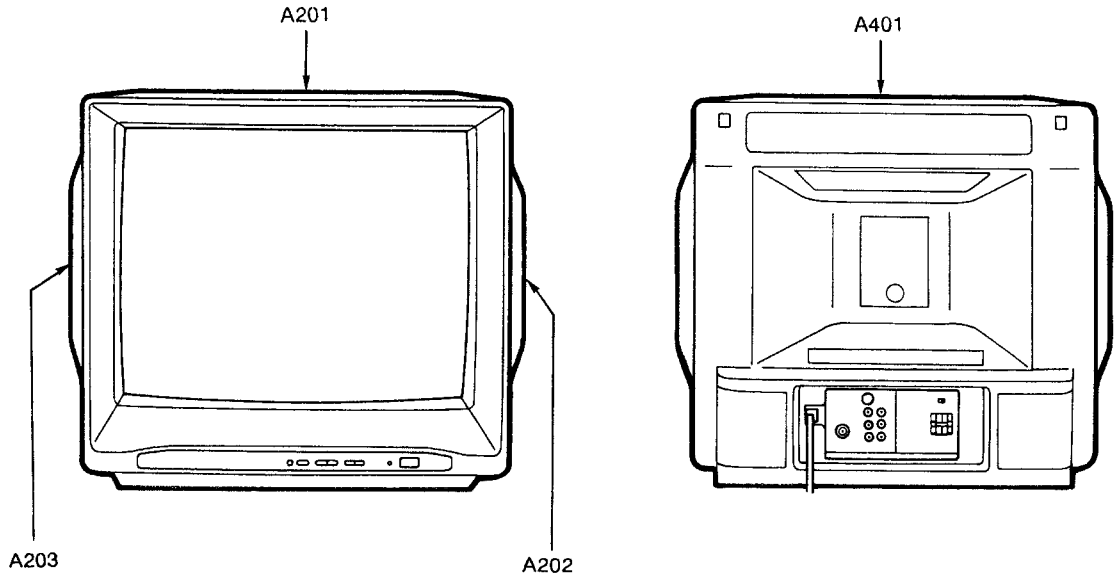
8. OUT OF VERT. SYNC. AND HORIZ. SYNC.

Check/Replace Sync Circuit pin 33 of IC501.

9. OUT OF HORIZ. SYNC.

Check/Replace Horiz. OSC Circuit and Horiz. AFC Circuit connected to Pins 36, 37 and 38 of IC501. Check/Replace IC501.

CABINET REPLACEMENT PARTS LIIST



Location No.	Part No.	Description
A201	23418505	Front Cover
A202	23864285	Speaker Frame (Right)
A203	23864286	Speaker Frame (Left)
A401	23423492	Back Cover
A501	23030975	Screw, BRBTBS5X20 SZN
A701	23523435	Carton Box
Y101	23994798	Owner's Guidebook
Y108	23122780	AC Adaptor, 2P
Y111	23164720	Connector
Y125	23293988	Adapter, Aerial Matching
Y126	23124971	Aerial, VHF Telescopic

CHASSIS REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION" , "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

CAUTION: The international hazard symbols in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

NOTICE: The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.

ABBREVIATIONS:

Capacitors.....	CD	: Ceramic Disk	PF	: Plastic Film	EL	: Electrolytic
Resistors.....	CF	: Carbon Film	CC	: Carbon Composition	MF	: Metal Film
	OMF	: Oxide Metal Film	VR	: Variable Resistor	FR	: Fusible Resistor

(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C101	24212102	CD, 1000pF, ±10%
C102	24538103	PF, 0.01μF
C103	24232103	CD, 0.01μF, +80%, −20%
C104	24206228	EL, 0.22μF, 50V
C105	24232103	CD, 0.01μF, +80%, −20%
C106	24232103	CD, 0.01μF, +80%, −20%
C107	24232102	CD, 1000pF, +80%, −20%
C109	24085988	EL, 1μF, ±20%, 50V, Non-Polar
C111	24636470	EL, 47μF, 50V
C112	24232103	CD, 0.01μF, +80%, −20%
C115	24232103	CD, 0.01μF, +80%, −20%
C122	24794101	EL, 100μF, 16V
C124	24232103	CD, 0.01μF, +80%, −20%
C127	24591272	PF, 2700pF
C161	24232102	CD, 1000pF, +80%, −20%
C162	24232103	CD, 0.01μF, +80%, −20%
C163	24212102	CD, 1000pF, ±10%
C164	24085988	EL, 1μF, ±20%, 50V, Non-Polar
C171	24436240	CD, 24pF
C172	24212102	CD, 1000pF, ±10%
C201	24636100	EL, 10μF, 50V
C202	24797101	EL, 100μF, 50V
C203	24232103	CD, 0.01μF, +80%, −20%
C204	24797220	EL, 22μF, 50V
C205	24636478	EL, 0.47μF, 50V
C206	24794101	EL, 100μF, 16V
C208	24212101	CD, 100pF, ±10%
C209	24232103	CD, 0.01μF, +80%, −20%
C210	24636100	EL, 10μF, 50V
C221	24203101	EL, 100μF, ±20%, 16V
C240	24538474	PF, 0.47μF
C301	24766229	CD, 1500pF, ±10%
C302	24212152	CD, 1500pF, ±10%
C303	24617915	EL, 1μF, ±10%, 50V
C307	24232103	CD, 0.01μF, +80%, −20%
C311	24669102	EL, 1000μF, 35V
C313	24797101	EL, 100μF, 50V
C315	24214221	CD, 220pF, ±10%, 500V

Location No.	Part No.	Description
C316	24795332	EL, 3300μF, 25V
C317	24617915	EL, 1μF, ±10%, 50V
C320	24095678	PF, 0.22μF, ±10%, 100V
C321	24214221	CD, 220pF, 500V
C322	24590332	PF, 3300pF
C330	24794471	EL, 470μF, 16V
C402	24353241	CD, 240pF
C403	24636339	EL, 3.3μF, 50V
C405	24593203	PF, 0.02μF
C406	24593183	PF, 0.018μF
C407	24593243	PF, 0.024μF
C409	24232103	CD, 0.01μF, +80%, −20%
C410	24794470	EL, 47μF, 16V
C411	24617929	EL, 18μF, 50V
C413	24212561	CD, 560pF, ±10%
C416	24214271	CD, 270pF, ±10%, 500V
C420	24693272	PF, 2700pF, 100V
⚠ C440	24095635	PF, 7000pF, ±3%, 1600V
C441	24214221	CD, 220pF, ±10%, 500V
C442	24095947	PF, 0.39μF, 200V
C443	24214221	CD, 220pF, ±10%, 500V
C445	24828563	PF, 0.056μF, 200V
C446	24214102	CD, 1000pF, ±10%, 500V
C447	24644100	EL, 10μF, 250V
C448	24794222	EL, 2200μF, 16V
C449	24794471	EL, 470μF, 16V
C451	24640972	EL, 33μF, 160V
⚠ C463	24212222	CD, 2200pF, ±10%
C501	24797101	EL, 100μF, 50V
C502	24212102	CD, 1000pF, ±10%
C503	24436101	CD, 100pF
C504	24353150	CD, 15pF
C505	24593273	PF, 0.027μF
C506	24593273	PF, 0.027μF
C507	24593103	PF, 0.01μF
C508	24085028	EL, 2.2μF, 25V, Non-Polar
C509	24353330	CD, 33pF
C510	24232103	CD, 0.01μF, +80%, −20%
C511	24232103	CD, 0.01μF, +80%, −20%
C512	24353200	CD, 20pF
C513	24436101	CD, 100pF

Location No.	Part No.	Description
C514	24636100	EL, 10μF, 50V
C515	24636010	EL, 1μF, 50V
C516	24538104	PF, 0.1μF
C517	24538104	PF, 0.1μF
C518	24232103	CD, 0.01μF, +80%, −20%
C520	24636478	EL, 0.47μF, 50V
C521	24538474	PF, 0.47μF
C522	24538474	PF, 0.47μF
C523	24538474	PF, 0.47μF
C524	24232103	CD, 0.01μF, +80%, −20%
C525	24436820	CD, 82pF
C526	24436820	CD, 82pF
C527	24436820	CD, 82pF
C528	24797220	EL, 22μF, 50V
C529	24353300	CD, 30pF
C530	24232103	CD, 0.01μF, +80%, −20%
C531	24636100	EL, 10μF, 50V
C532	24436300	CD, 30pF
C533	24436270	CD, 27pF
C534	24436220	CD, 22pF
C535	24636100	EL, 10μF, 50V
C536	24636478	EL, 0.47μF, 50V
C537	24794101	EL, 100μF, 16V
C539	24232103	CD, 0.01μF, +80%, −20%
C601	24636010	EL, 1μF, 50V
C605	24232103	CD, 0.01μF, +80%, −20%
C609	24232103	CD, 0.01μF, +80%, −20%
C610	24794101	EL, 100μF, 16V
C612	24353510	CD, 51pF
C613	24436471	CD, 470pF
C614	24635479	EL, 4.7μF, 35V
C615	24635479	EL, 4.7μF, 35V
C617	24636479	EL, 4.7μF, 50V
C618	24636229	EL, 2.2μF, 50V
C619	24593222	PF, 2200pF
C620	24538563	PF, 0.056μF
C621	24538103	PF, 0.01μF
C623	24232103	CD, 0.01μF, +80%, −20%
C624	24538104	PF, 0.1μF
C625	24794470	EL, 47μF, 16V
C626	24538104	PF, 0.1μF
C627	24538103	PF, 0.01μF
C628	24538563	PF, 0.056μF
C629	24593222	PF, 2200pF
C630	24633330	EL, 33μF, 16V
C632	24636010	EL, 1μF, 50V
C670	24232103	CD, 0.01μF, +80%, −20%
C671	24232103	CD, 0.01μF, +80%, −20%
C672	24232103	CD, 0.01μF, +80%, −20%
C673	24436471	CD, 470pF
C674	24436471	CD, 470pF
C675	24795101	EL, 100μF, 25V
C676	24436220	CD, 22pF
C677	24636010	EL, 1μF, 50V
C679	24232103	CD, 0.01μF, +80%, −20%
C680	24436470	CD, 47pF
C681	24436470	CD, 47pF
C682	24232103	CD, 0.01μF, +80%, −20%
C801	24095951	PF, 0.1μF, ±20%, AC250V
C802	24094653	CD, 220pF, ±20%, AC400V
C803	24094653	CD, 220pF, ±20%, AC400V
C804	24095951	PF, 0.1μF, ±20%, AC250V
C805	24092281	CD, 4700pF, ±20%, AC250V
C806	24092281	CD, 4700pF, ±20%, AC250V

Location No.	Part No.	Description
C807	24092281	CD, 4700pF, ±20%, AC250V
C808	24092281	CD, 4700pF, ±20%, AC250V
C809	24086915	EL, 270μF, ±20%, 450V
C820	24591822	PF, 8200pF
C821	24794102	EL, 1000μF, 16V
C822	24591822	PF, 8200pF
C824	24092347	CD, 1500pF, ±10%, 2kV
C825	24214102	CD, 1000pF, ±10%, 500V
C826	24795471	EL, 470μF, 25V
C827	24214102	CD, 1000pF, ±10%, 500V
C828	24232103	CD, 0.01μF, +80%, −20%
C829	24796222	EL, 2200μF, 35V
C830	24442221	CD, 220pF, ±10%, 2kV
C831	24086953	EL, 220μF, ±20%, 160V
C832	24636479	EL, 4.7μF, 50V
C833	24591242	PF, 2400pF
C834	24794470	EL, 47μF, 16V
C835	24538104	PF, 0.1μF
C836	24633100	EL, 10μF, 16V
C837	24591333	PF, 0.033μF
C838	24636100	EL, 10μF, 50V
C839	24214471	CD, 470pF, ±10%, 500V
C840	24214561	CD, 560pF, ±10%, 500V
C841	24435330	CD, 33pF, 500V
C842	24435330	CD, 33pF, 500V
C844	24094655	CD, 1000pF, ±20%, AC400V
C845	24794471	EL, 470μF, 16V
C846	24538104	PF, 0.1μF
C847	24442471	CD, 470pF, ±10%, 2kV
C848	24214561	CD, 560pF, ±10%, 500V
C849	24436150	CD, 15pF
C901	24640987	EL, 2.2μF, 350V
C902	24095981	PF, 2200pF, 1600V
CA02	24633100	EL, 10μF, 16V
CA03	24636010	EL, 1μF, 50V
CA04	24633100	EL, 10μF, 16V
CA05	24212102	CD, 1000pF, ±10%
CA06	24633100	EL, 10μF, 16V
CA07	24633100	EL, 10μF, 16V
CA08	24633100	EL, 10μF, 16V
CA11	24212221	CD, 220pF, ±10%
CA12	24436221	CD, 220pF
CA13	24636229	EL, 2.2μF, 50V
CA14	24232103	CD, 0.01μF, +80%, −20%
CA15	24538104	PF, 0.1μF
CA16	24538104	PF, 0.1μF
CA17	24538104	PF, 0.1μF
CA18	24206229	EL, 2.2μF, 50V
CA19	24636010	EL, 1μF, 50V
CA21	24206229	EL, 2.2μF, 50V
CA22	24763101	EL, 100μF, 16V
CA28	24212102	CD, 1000pF, ±10%
CA29	24590472	PF, 4700pF
CA30	24436561	CD, 560pF
CA31	24636010	EL, 1μF, 50V
CA32	24212102	CD, 1000pF, ±10%
CA33	24232103	CD, 0.01μF, +80%, −20%
CA37	24436101	CD, 100pF
CA38	24212102	CD, 1000pF, ±10%
CA39	24212101	CD, 100pF, ±10%
CA44	24633100	EL, 10μF, 16V
CA45	23766100	EL, 10μF, 50V
CB20	24538104	PF, 0.1μF
CH13	24206100	EL, 10μF, 50V

Location No.	Part No.	Description
CH17	24206100	EL, 10μF, 50V
CH18	24202221	EL, 220μF, ±20%, 10V
CH19	24202221	EL, 220μF, ±20%, 10V
CM01	24436201	CD, 200pF
CM02	24436201	CD, 200pF
CM05	24232103	CD, 0.01μF, +80%, −20%
CM06	24357270	CD, 27pF
CM07	24590563	PF, 0.056μF
CM08	24232103	CD, 0.01μF, +80%, −20%
CM09	24232103	CD, 0.01μF, +80%, −20%
CM10	24436270	CD, 27pF
CN02	24353360	CD, 36pF
CN08	24232103	CD, 0.01μF, +80%, −20%
CN09	24232103	CD, 0.01μF, +80%, −20%
CN10	24436101	CD, 100pF
CN11	24436330	CD, 33pF
CN13	24232103	CD, 0.01μF, +80%, −20%
CN14	24436330	CD, 33pF
CN15	24436330	CD, 33pF
CN16	24436330	CD, 33pF
CN17	24436471	CD, 470pF
CN40	24232103	CD, 0.01μF, +80%, −20%
CN41	24436470	CD, 47pF
CN42	24436470	CD, 47pF
CN52	24093950	Variable Capacitor, 5.5 to 30pF, 100V
CS04	24436471	CD, 470pF
CS05	24636478	EL, 0.47μF, 50V
CS06	24633330	EL, 33μF, 16V
CS07	24633100	EL, 10μF, 16V
CS08	24538224	PF, 0.22μF
CS09	24633100	EL, 10μF, 16V
CS19	24794470	EL, 47μF, 16V
CS20	24636478	EL, 0.47μF, 50V
CS21	24636478	EL, 0.47μF, 50V
CS22	24794470	EL, 47μF, 16V
CS23	24795470	EL, 47μF, 25V
CS24	24538104	PF, 0.1μF
CS25	24796471	EL, 470μF, 35V
CS26	24795102	EL, 1000μF, 25V
CS27	24795102	EL, 1000μF, 25V
CS28	24538104	PF, 0.1μF
CS32	24538104	PF, 0.1μF
CS33	24538104	PF, 0.1μF
CS34	24636010	EL, 1μF, 50V
CS35	24796470	EL, 47μF ,35V
CV01	24206010	EL, 1μF, 50V
CV02	24206010	EL, 1μF, 50V
CV03	24206100	EL, 10μF, 50V
CV04	24206010	EL, 1μF, 50V
CV05	24206010	EL, 1μF, 50V
CV06	24206220	EL, 22μF, 50V
CV07	24232103	CD, 0.01μF, +80%, −20%
CV10	24232103	CD, 0.01μF, +80%, −20%
CV14	24232103	CD, 0.01μF, +80%, −20%
CV15	24203101	EL, 100μF, ±20%, 16V
CV17	24206010	EL, 1μF, 50V
CV20	24206010	EL, 1μF, 50V
CV21	24206010	EL, 1μF, 50V
CV22	24203100	EL, 10μF, ±20%, 16V
CV23	24203100	EL, 10μF, ±20%, 16V
CV25	24436101	CD, 100pF
CV26	24232103	CD, 0.01μF, +80%, −20%
CX02	24538104	PF, 0.1μF
CX03	24538104	PF, 0.1μF
CX04	24538104	PF, 0.1μF

RESISTORS

Location No.	Part No.	Description
R101	24366152	CF, 1500 ohm
R102	24366101	CF, 100 ohm
R103	24366152	CF, 1500 ohm
R104	24366103	CF, 10k ohm
R105	24366104	CF, 100k ohm
R106	24366223	CF, 22k ohm
R107	24366682	CF, 6800 ohm
R108	24366222	CF, 2200 ohm
R109	24366332	CF, 3300 ohm
R110	24366102	CF, 1k ohm
R111	24366103	CF, 10k ohm
R112	24366682	CF, 6800 ohm
R122	24383680	OMF, 68 ohm, 2W
R151	24066953	VR, 5k ohm, 1/10W
R152	24066946	VR, 1M ohm, 1/10W
R160	24366473	CF, 47k ohm
R161	24366131	CF, 130 ohm
R162	24366102	CF, 1k ohm
R163	24366562	CF, 5600 ohm
R164	24552201	OMF, 200 ohm, 1/2W
R165	24366473	CF, 47k ohm
R166	24366270	CF, 27 ohm
R167	24366680	CF, 68 ohm
R168	24366561	CF, 560 ohm
R169	24366102	CF, 1k ohm
R171	24366102	CF, 1k ohm
R172	24366394	CF, 390k ohm
R208	24366101	CF, 100 ohm
R209	24366103	CF, 10k ohm
R210	24366203	CF, 20k ohm
R211	24366622	CF, 6200 ohm
R212	24366103	CF, 10k ohm
R213	24366152	CF, 1500 ohm
R214	24366821	CF, 820 ohm
R216	24366133	CF, 13k ohm
R218	24366222	CF, 2200 ohm
R219	24366472	CF, 4700 ohm
R220	24366224	CF, 220k ohm
R229	24366132	CF, 1300 ohm
R230	24366152	CF, 1500 ohm
R231	24366272	CF, 2700 ohm
R233	24366103	CF, 10k ohm
R234	24366103	CF, 10k ohm
R241	24366102	CF, 1k ohm
R242	24366183	CF, 18k ohm
R243	24366153	CF, 15k ohm
R244	24366121	CF, 120 ohm
R246	24552151	OMF, 150 ohm, 1/2W
R247	24366331	CF, 330 ohm
R252	24061591	VR, 2k ohm, 1/8W
R253	24061591	VR, 2k ohm, 1/8W
R255	24066600	VR, 10k ohm, 1/10W
R301	24366301	CF, 300 ohm
R302	24366244	CF, 240k ohm
R303	24366273	CF, 27k ohm
R304	24366102	CF, 1k ohm
R305	24366161	CF, 160 ohm
R306	24366561	CF, 560 ohm
R311	24552242	OMF, 2400 ohm, 1/2W
R313	24366102	CF, 1k ohm

Location No.	Part No.	Description
R315	24366183	CF, 18k ohm
R316	24366203	CF, 20k ohm
R317	24383271	OMF, 270 ohm, 2W
R318	24366184	CF, 180k ohm
R319	24552122	OMF, 1200 ohm, 1/2W
R320	24366224	CF, 220k ohm
R323	24322229	OMF, 2.2 ohm, 1W
R327	24532130	FR, 13 ohm, 1W
R333	24366471	CF, 470 ohm
R340	24366472	CF, 4700 ohm
R341	24366103	CF, 10k ohm
R351	24066602	VR, 50k ohm, 1/10W
R386	24366561	CF, 560 ohm
R402	24366273	CF, 27k ohm
R403	24366302	CF, 3k ohm
R404	24552432	OMF, 4300 ohm, 1/2W
R405	24366511	CF, 510 ohm
R406	24366360	CF, 36 ohm
R407	24366750	CF, 75 ohm
R408	24366332	CF, 3300 ohm
R409	24366103	CF, 10k ohm
R410	24366331	CF, 330 ohm
R411	24366391	CF, 390 ohm
R412	24366121	CF, 120 ohm
R413	24366103	CF, 10k ohm
R414	24366472	CF, 4700 ohm
R416	24007566	Cement, 2k ohm, 5W
R418	24366682	CF, 6800 ohm
R420	24552472	OMF, 4700 ohm, 1/2W
R421	24366564	CF, 560k ohm
R422	24366135	CF, 1.3M ohm
R440	24366103	CF, 10k ohm
R441	24366103	CF, 10k ohm
R442	24322109	OMF, 1 ohm, 1W
R443	24322109	OMF, 1 ohm, 1W
R446	24377102	CF, 1k ohm, 1W
R447	24377331	CF, 330 ohm, 1W
R448	24547309	FR, 3 ohm, 1W
R502	24366334	CF, 330k ohm
R503	24366202	CF, 2k ohm
R504	24366471	CF, 470 ohm
R505	24366822	CF, 8200 ohm
R507	24366822	CF, 8200 ohm
R509	24366203	CF, 20k ohm
R510	24366101	CF, 100 ohm
R511	24366562	CF, 5600 ohm
R512	24366152	CF, 1500 ohm
R513	24366152	CF, 1500 ohm
R515	24366221	CF, 220 ohm
R516	24366221	CF, 220 ohm
R517	24366221	CF, 220 ohm
R518	24945185	CC, 1.8M ohm, ±10%, 1/4W
R519	24366913	CF, 91k ohm
R520	24366332	CF, 3300 ohm
R521	24366102	CF, 1k ohm
R522	24360185	CF, 1.8M ohm, 1/8W
R523	24366821	CF, 820 ohm
R525	24366122	CF, 1200 ohm
R526	24366821	CF, 820 ohm
R527	24366103	CF, 10k ohm
R528	24366103	CF, 10k ohm
R529	24366122	CF, 1200 ohm
R531	24366102	CF, 1k ohm
R532	24366272	CF, 2700 ohm

Location No.	Part No.	Description
R533	24366132	CF, 1300 ohm
R534	24376104	CF, 100k ohm, 1/2W
R535	24366332	CF, 3300 ohm
R536	24376104	CF, 100k ohm, 1/2W
R537	24366132	CF, 1300 ohm
R538	24366332	CF, 3300 ohm
R539	24366132	CF, 1300 ohm
R540	24376104	CF, 100k ohm, 1/2W
R541	24366821	CF, 820 ohm
R542	24366271	CF, 270 ohm
R543	24366103	CF, 10k ohm
R544	24366101	CF, 100 ohm
R547	24366471	CF, 470 ohm
R548	24366471	CF, 470 ohm
R549	24366471	CF, 470 ohm
R551	24066955	VR, 1k ohm, 1/10W
R557	24061591	VR, 2k ohm, 1/8W
R558	24061591	VR, 2k ohm, 1/8W
R559	24061591	VR, 2k ohm, 1/8W
R560	24366912	CF, 9100 ohm
R561	24366912	CF, 9100 ohm
R562	24366912	CF, 9100 ohm
R563	24366104	CF, 100k ohm
R591	24383153	OMF, 15k ohm, 2W
R592	24383153	OMF, 15k ohm, 2W
R593	24383153	OMF, 15k ohm, 2W
R594	24366103	CF, 10k ohm
R596	24366103	CF, 10k ohm
R597	24366103	CF, 10k ohm
R602	24366472	CF, 4700 ohm
R607	24366101	CF, 100 ohm
R608	24366473	CF, 47k ohm
R609	24366102	CF, 1k ohm
R610	24366103	CF, 10k ohm
R611	24366103	CF, 10k ohm
R612	24366103	CF, 10k ohm
R613	24366472	CF, 4700 ohm
R624	24366154	CF, 150k ohm
R625	24366154	CF, 150k ohm
R629	24366184	CF, 180k ohm
R630	24366472	CF, 4700 ohm
R631	24366103	CF, 10k ohm
R632	24366562	CF, 5600 ohm
R633	24366562	CF, 5600 ohm
R634	24366103	CF, 10k ohm
R635	24366472	CF, 4700 ohm
R641	24366223	CF, 22k ohm
R670	24366821	CF, 820 ohm
R671	24366272	CF, 2700 ohm
R672	24366152	CF, 1500 ohm
R673	24366152	CF, 1500 ohm
R674	24366821	CF, 820 ohm
R675	24366122	CF, 1200 ohm
R676	24366105	CF, 1M ohm
R677	24552561	OMF, 560 ohm, 1/2W
R678	24366152	CF, 1500 ohm
R679	24366473	CF, 47k ohm
R680	24366104	CF, 100k ohm
R688	24366221	CF, 220 ohm
R689	24366102	CF, 1k ohm
R690	24366102	CF, 1k ohm
R691	24366223	CF, 22k ohm
R692	24552680	OMF, 68 ohm, 1/2W
R693	24366103	CF, 10k ohm

Location No.	Part No.	Description
R694	24366472	CF, 4700 ohm
R695	24366102	CF, 1k ohm
R696	24366124	CF, 120k ohm
R801	24946565	CC, 5.6M ohm, ±10%, 1/2W
R802	24007885	Cement, 2.2 ohm, 10W
R810	24366301	CF, 300 ohm
R811	24366181	CF, 180 ohm
R812	24366333	CF, 33k ohm
R813	24366111	CF, 110 ohm
R814	24366222	CF, 2200 ohm
R815	24552511	OMF, 510 ohm, 1/2W
R817	24366332	CF, 3300 ohm
R822	24383680	OMF, 68 ohm, 2W
R823	24552102	OMF, 1k ohm, 1/2W
R825	24366391	CF, 390 ohm
R826	24383200	OMF, 20 ohm, 2W
R827	24366331	CF, 330 ohm
R828	24377274	CF, 270k ohm, 1W
R830	24366332	CF, 3300 ohm
R833	24366560	CF, 56 ohm
R834	24366510	CF, 51 ohm
R835	24552511	OMF, 510 ohm, 1/2W
R836	24552331	OMF, 330 ohm, 1/2W
R837	24366223	CF, 22k ohm
R839	24322308	OMF, 0.3 ohm, 1W
R841	24982479	MF, 4.7 ohm, 1/2W
R842	24366560	CF, 56 ohm
R843	24383472	OMF, 4700 ohm, ±1%, 2W
R845	24982228	OMF, 0.22 ohm, 1/2W
R847	24366152	CF, 1500 ohm
R848	24367332	CF, 3300 ohm, ±2%
R849	24553393	OMF, 39k ohm, 1W
R850	24366102	CF, 1k ohm
R851	24366152	CF, 1500 ohm
R852	24366333	CF, 33k ohm
R853	24367332	CF, 3300 ohm, ±2%
R854	24367332	CF, 3300 ohm, ±2%
R855	24366103	CF, 10k ohm
R856	24366561	CF, 560 ohm
R857	24366472	CF, 4700 ohm
R858	24383362	OMF, 3600 ohm, 2W
R859	24383242	OMF, 2400 ohm, 2W
R860	24366472	CF, 4700 ohm
R861	24366473	CF, 47k ohm
R862	24366222	CF, 2200 ohm
R863	24366103	CF, 10k ohm
R867	24366102	CF, 1k ohm
R868	24377274	CF, 270k ohm, 1W
R869	24366363	CF, 36k ohm
R876	24366560	CF, 56 ohm
R884	24321919	OMF, 9.1 ohm, 1/2W
R890	24000875	PTC Thermistor, 18 ohm, ±20%, 290V
R901	24946272	CC, 2700 ohm, ±10%, 1/2W
R902	24946272	CC, 2700 ohm, ±10%, 1/2W
R903	24946272	CC, 2700 ohm, ±10%, 1/2W
R920	24000890	FR, 1.6 ohm, 1W
RA01	24366272	CF, 2700 ohm
RA02	24366102	CF, 1k ohm
RA03	24366101	CF, 100 ohm
RA04	24366101	CF, 100 ohm
RA05	24366101	CF, 100 ohm
RA06	24366103	CF, 10k ohm
RA07	24366471	CF, 470 ohm

Location No.	Part No.	Description
RA08	24366471	CF, 470 ohm
RA09	24366102	CF, 1k ohm
RA10	24366102	CF, 1k ohm
RA11	24366102	CF, 1k ohm
RA12	24366103	CF, 10k ohm
RA13	24366102	CF, 1k ohm
RA14	24366471	CF, 470 ohm
RA15	24366471	CF, 470 ohm
RA16	24366471	CF, 470 ohm
RA17	24366471	CF, 470 ohm
RA18	24366472	CF, 4700 ohm
RA19	24366222	CF, 2200 ohm
RA20	24366223	CF, 22k ohm
RA21	24366102	CF, 1k ohm
RA22	24366472	CF, 4700 ohm
RA23	24366102	CF, 1k ohm
RA24	24366472	CF, 4700 ohm
RA26	24366472	CF, 4700 ohm
RA27	24366103	CF, 10k ohm
RA28	24366103	CF, 10k ohm
RA29	24366102	CF, 1k ohm
RA30	24366102	CF, 1k ohm
RA31	24366471	CF, 470 ohm
RA32	24366102	CF, 1k ohm
RA33	24366103	CF, 10k ohm
RA34	24366103	CF, 10k ohm
RA37	24366103	CF, 10k ohm
RA38	24366103	CF, 10k ohm
RA39	24366103	CF, 10k ohm
RA40	24366223	CF, 22k ohm
RA41	24366103	CF, 10k ohm
RA42	24366392	CF, 3900 ohm
RA43	24366103	CF, 10k ohm
RA44	24366753	CF, 75k ohm
RA45	24366564	CF, 560k ohm
RA46	24366751	CF, 750 ohm
RA47	24366103	CF, 10k ohm
RA48	24366102	CF, 1k ohm
RA52	24366222	CF, 2200 ohm
RA53	24366332	CF, 3300 ohm
RA54	24366223	CF, 22k ohm
RA55	24366333	CF, 33k ohm
RA56	24366333	CF, 33k ohm
RA57	24366333	CF, 33k ohm
RA58	24366221	CF, 220 ohm
RA59	24366223	CF, 22k ohm
RA60	24366333	CF, 33k ohm
RA61	24366392	CF, 3900 ohm
RA62	24366333	CF, 33k ohm
RA63	24366563	CF, 56k ohm
RA64	24383103	OMF, 10k ohm, 2W
RA65	24366103	CF, 10k ohm
RA66	24366103	CF, 10k ohm
RA67	24366102	CF, 1k ohm
RA68	24366102	CF, 1k ohm
RA69	24366102	CF, 1k ohm
RA70	24366102	CF, 1k ohm
RA71	24366332	CF, 3300 ohm
RA72	24366102	CF, 1k ohm
RA73	24366223	CF, 22k ohm
RA74	24366102	CF, 1k ohm
RA75	24366102	CF, 1k ohm
RA76	24366102	CF, 1k ohm
RA77	24366102	CF, 1k ohm

Location No.	Part No.	Description
RA78	24366222	CF, 2200 ohm
RA83	24366471	CF, 470 ohm
RA84	24366471	CF, 470 ohm
RA85	24366471	CF, 470 ohm
RA87	24366222	CF, 2200 ohm
RA88	24366221	CF, 220 ohm
RA89	24366271	CF, 270 ohm
RA90	24366222	CF, 2200 ohm
RA92	24366103	CF, 10k ohm
RA93	24366201	CF, 200 ohm
RA94	24366391	CF, 390 ohm
RA95	24366471	CF, 470 ohm
RA96	24360473	CF, 47k ohm, 1/8W
RA97	24360473	CF, 47k ohm, 1/8W
RA98	24366473	CF, 47k ohm
RB07	24366512	CF, 5100 ohm
RB08	24366103	CF, 10k ohm
RB11	24366102	CF, 1k ohm
RB12	24366102	CF, 1k ohm
RB13	24366102	CF, 1k ohm
RB20	24946226	CC, 22M ohm, ±10%, 1/2W
RB22	24366153	CF, 15k ohm
RB23	24366153	CF, 15k ohm
RB24	24366102	CF, 1k ohm
RB25	24366103	CF, 10k ohm
RB26	24366223	CF, 22k ohm
RB27	24366102	CF, 1k ohm
RB28	24366102	CF, 1k ohm
RM03	24366182	CF, 1800 ohm
RM04	24366242	CF, 2400 ohm
RM05	24366121	CF, 120 ohm
RM06	24941475	CC, 4.7M ohm, 1/4W
RM16	24366333	CF, 33k ohm
RN01	24366223	CF, 22k ohm
RN02	24366331	CF, 330 ohm
RN05	24366103	CF, 10k ohm
RN11	24366514	CF, 510k ohm
RN12	24366272	CF, 2700 ohm
RN13	24366103	CF, 10k ohm
RN14	24366103	CF, 10k ohm
RN15	24366223	CF, 22k ohm
RN16	24366103	CF, 10k ohm
RN17	24366471	CF, 470 ohm
RN18	24366201	CF, 200 ohm
RN19	24366102	CF, 1k ohm
RN21	24366332	CF, 3300 ohm
RN22	24366223	CF, 22k ohm
RN24	24366103	CF, 10k ohm
RN26	24366103	CF, 10k ohm
RN27	24366103	CF, 10k ohm
RN31	24366103	CF, 10k ohm
RN32	24366392	CF, 3900 ohm
RN39	24366201	CF, 200 ohm
RN40	24366471	CF, 470 ohm
RN41	24366103	CF, 10k ohm
RN42	24366103	CF, 10k ohm
RN43	24366222	CF, 2200 ohm
RN44	24366471	CF, 470 ohm
RS01	24366132	CF, 1300 ohm
RS05	24366472	CF, 4700 ohm
RS06	24366562	CF, 5600 ohm
RS08	24366392	CF, 3900 ohm
RS10	24366392	CF, 3900 ohm
RS11	24366823	CF, 82k ohm

Location No.	Part No.	Description
RS12	24366823	CF, 82k ohm
RS13	24366103	CF, 10k ohm
RS14	24366563	CF, 56k ohm
RS15	24366222	CF, 2200 ohm
RS16	24366202	CF, 2k ohm
RS17	24366123	CF, 12k ohm
RS18	24366102	CF, 1k ohm
RS19	24366103	CF, 10k ohm
RS37	24366682	CF, 6800 ohm
RS38	24366103	CF, 10k ohm
RS39	24366682	CF, 6800 ohm
RS40	24366103	CF, 10k ohm
RS41	24366229	CF, 2.2 ohm
RS42	24366229	CF, 2.2 ohm
RS43	24366563	CF, 56k ohm
RS60	24366223	CF, 22k ohm
RS61	24366223	CF, 22k ohm
RS62	24366273	CF, 27k ohm
RS64	24366103	CF, 10k ohm
RS65	24366103	CF, 10k ohm
RV03	24366101	CF, 100 ohm
RV04	24366751	CF, 750 ohm
RV05	24366102	CF, 1k ohm
RV06	24366101	CF, 100 ohm
RV12	24366101	CF, 100 ohm
RV15	24366101	CF, 100 ohm
RV16	24366101	CF, 100 ohm
RV20	24366101	CF, 100 ohm
RV22	24366102	CF, 1k ohm
RV31	24366102	CF, 1k ohm
RV32	24366332	CF, 3300 ohm
RV33	24366332	CF, 3300 ohm
RV34	24552750	OMF, 75 ohm, 1/2W
RV35	24366101	CF, 100 ohm
RV36	24366102	CF, 1k ohm
RV37	24366331	CF, 330 ohm
RV38	24366101	CF, 100 ohm
RV41	24366103	CF, 10k ohm
RV42	24366103	CF, 10k ohm
RV43	24366104	CF, 100k ohm
RV45	24366820	CF, 82 ohm
RV46	24366820	CF, 82 ohm
RV47	24366471	CF, 470 ohm
RV52	24366102	CF, 1k ohm
RV55	24366102	CF, 1k ohm
RV57	24366473	CF, 47k ohm
RV58	24366103	CF, 10k ohm
RV60	24366680	CF, 68 ohm
RV61	24366103	CF, 10k ohm
RV66	24366910	CF, 91 ohm
RV68	24366473	CF, 47k ohm
RV69	24366102	CF, 1k ohm
RV70	24366473	CF, 47k ohm
RV71	24366102	CF, 1k ohm
RV73	24366331	CF, 330 ohm
RV74	24366104	CF, 100k ohm
RV75	24366223	CF, 22k ohm
RV77	24366473	CF, 47k ohm
RV79	24366102	CF, 1k ohm
RV80	24366104	CF, 100k ohm
RV81	24366102	CF, 1k ohm
RV82	24366473	CF, 47k ohm
RV83	24366473	CF, 47k ohm
RV84	24366473	CF, 47k ohm

Location No.	Part No.	Description
RV85	24366473	CF, 47k ohm
RV86	24366104	CF, 100k ohm
RV87	24366102	CF, 1k ohm
RV88	24366102	CF, 1k ohm
RV91	24366271	CF, 270 ohm
RX02	24366102	CF, 1k ohm
RX05	24366203	CF, 20k ohm
RX07	24366222	CF, 2200 ohm
RX13	24366102	CF, 1k ohm
COILS & TRANSFORMERS		
L102	23262855	Coil, PIF, TRF1453
L105	23238928	Coil, Peaking, TRF4339AC
L106	23238714	Coil, Peaking, TRF4100AC
L151	23262813	Coil, IF, TRF1077D
L152	23262813	Coil, IF, TRF1077D
L162	23201005	Coil, Choke, TRF9202C
L203	23237973	Coil, Peaking, TRF4151AC
L240	23238928	Coil, Peaking, TRF4339AC
L241	23238923	Coil, Peaking, TRF4829AC
L311	23261974	Coil, Choke, HC5-035
L406	23103859	Coil (Ferrite Bead), TEM2011
L408	23221026	Coil, Choke, AZ9004Y
L411	23233065	Coil, Linearity, TLN2111
L413	23103859	Coil (Ferrite Bead), TEM2011
⚠ L462	23227265	Deflection Yoke, TDY-621NA
L501	23238562	Coil, Peaking, TRF4109AJ
L503	23238922	Coil, Peaking, TRF4100AC
L504	23238922	Coil, Peaking, TRF4100AC
L551	23250972	Coil, 1H-Delay Matching, TRF5418D
L590	23238916	Coil, Peaking, TRF4330AC
L651	23232946	Coil, Variable, TRF3073D
L671	23262739	Coil, IF, TRF1126D
L672	23262739	Coil, IF, TRF1126D
L673	23238918	Coil, Peaking, TRF4220AC
L821	23222694	Coil, Width, TLN2026
L823	23261975	Coil, Choke, TRF9229
L824	23103859	Coil (Ferrite Bead), TEM2011
L826	23221026	Coil, Choke, AZ9004Y
L827	23103859	Coil (Ferrite Bead), TEM2011
L828	23103941	Coil (Ferrite Bead), TEM2000
L829	23103859	Coil (Ferrite Bead), TEM2011
⚠ L901	23200788	Coil, Degaussing, TSB2223
LA01	23237999	Coil, Peaking, TRF4109AC
LA02	23262776	Coil, IF, TRF1114
LA03	23221937	Coil, Choke, TLN3040
LM01	23262797	Coil, IF, TRF1093D
LM02	23250865	Coil, IF, TRF5414DA
LM03	23250865	Coil, IF, TRF5414DA
LM04	23262798	Coil, IF, TRF1092D
LN02	23238920	Coil, Peaking, TRF4150AC
LN03	23238918	Coil, Peaking, TRF4220AC
LN40	23238921	Coil, Peaking, TRF4120AC
LN41	23238921	Coil, Peaking, TRF4120AC
LV01	23237929	Coil, Peaking, TRF4360AC
LV02	23238923	Coil, Peaking, TRF4829AC
⚠ T401	23224983	Transformer, Horiz. Drive, TLN1039
⚠ T461	23236003	Transformer, Flyback, TFB4039AD
T801	23211899	Line Filter, TRF3166
T802	23211928	Line Filter, TRF3129
⚠ T803	23217093	Transformer, Converter, TPW3172
TN01	23262910	Coil, PIF trap, TRF1427G
TN02	23262843	Coil, PIF Trap, TRF1457D
SEMICONDUCTORS		
IC101	23318201	IC, T51496P
IC303	23119548	IC, AN5515
IC501	B0379470	IC, TA8659N
IC604	B0356190	IC, TA7630P
IC670	B0379150	IC, TA8615N
IC830	B0349250	IC, TA75393S
IC835	23318299	IC, L78MR05-FA
ICA01	23318481	IC, TMP47C434N3527Z
ICA02	B0491325	IC, TC89101P(Z)
ICA03	23119182	IC, μPD6336C
ICA30	23119441	IC, LA7910
ICS10	B0376856	IC, TA8211AH
ICV07	B0383505	IC, TA8720AN
Q161	A6708871	Transistor, 2SC388ATM
Q162	A6317440	Transistor, 2SC1815-Y
Q206	A6342200	Transistor, 2SC2878-A
Q240	A6534040	Transistor, 2SA1015-Y
Q241	A6319300	Transistor, 2SC1959-Y
Q301	A6317440	Transistor, 2SC1815-Y
Q303B	23035308	Screw, BTB3X8SZN
Q402	A6330069	Transistor, 2SC2482 FA-1
⚠ Q404	A6868706	Transistor, 2SD1427 FA-1
Q502	A6534040	Transistor, 2SA1015-Y
Q503	A6534040	Transistor, 2SA1015-Y
Q505	A6363200	Transistor, 2SC3619
Q506	A6317440	Transistor, 2SC1815-Y
Q508	A6363200	Transistor, 2SC3619
Q509	A6317440	Transistor, 2SC1815-Y
Q511	A6363200	Transistor, 2SC3619
Q512	A6317440	Transistor, 2SC1815-Y
Q514	A6509120	Transistor, 2SA562TM-O
Q515	A6317440	Transistor, 2SC1815-Y
Q516	A6317440	Transistor, 2SC1815-Y
Q517	A6002050	Transistor, RN1205
Q606	A6317440	Transistor, 2SC1815-Y
Q607	A6317440	Transistor, 2SC1815-Y
Q611	A6317440	Transistor, 2SC1815-Y
Q671	A6317440	Transistor, 2SC1815-Y
Q672	A6317440	Transistor, 2SC1815-Y
Q673	A6509140	Transistor, 2SA562TMY
Q674	A6317440	Transistor, 2SC1815-Y
Q820	A6333346	Transistor, 2SC2655-Y
Q821	A6330438	Transistor, 2SC2500-C
Q822	A6546470	Transistor, 2SA1300-GR
Q824	A6319300	Transistor, 2SC1959-Y
Q825	A6317440	Transistor, 2SC1815-Y
Q826	A8643106	Photo Coupler, TLP621(GR)
Q828	A6325067	Transistor, 2SC2230A-Y
Q829	A8643106	Photo Coupler, TLP621(GR)
Q831	A6317440	Transistor, 2SC1815-Y
Q832	A6317440	Transistor, 2SC1815-Y
Q833	A6317460	Transistor, 2SC1815-GR
Q834	A6002060	Transistor, RN1206
Q838	A6534040	Transistor, 2SA1015-Y
Q839	A6509140	Transistor, 2SA562TMY
Q840	A6317440	Transistor, 2SC1815-Y
QA05	A6534040	Transistor, 2SA1015-Y
QA06	A6534040	Transistor, 2SA1015-Y
QA07	A6317440	Transistor, 2SC1815-Y

Location No.	Part No.	Description
QA08	A6317440	Transistor, 2SC1815-Y
QA09	A6317440	Transistor, 2SC1815-Y
QA10	A6317440	Transistor, 2SC1815-Y
QA11	A6317440	Transistor, 2SC1815-Y
QA17	A6012010	Transistor, RN2201
QA18	A6534060	Transistor, 2SA1015-GR
QA19	A6317440	Transistor, 2SC1815-Y
QA20	A6317440	Transistor, 2SC1815-Y
QA21	A6534040	Transistor, 2SA1015-Y
QB11	A6734585	Transistor, 2SC752GTM-O
QB12	A6317440	Transistor, 2SC1815-Y
QB20	A6317440	Transistor, 2SC1815-Y
QN01	A6002060	Transistor, RN1206
QN02	A6534040	Transistor, 2SA1015-Y
QN03	A6534040	Transistor, 2SA1015-Y
QN04	A6317440	Transistor, 2SC1815-Y
QN05	A6317440	Transistor, 2SC1815-Y
QN06	A6002040	Transistor, RN1204
QN07	A6342200	Transistor, 2SC2878-A
QN08	A6002060	Transistor, RN1206
QN40	A6317440	Transistor, 2SC1815-Y
QS03	A6317440	Transistor, 2SC1815-Y
QS04	A6534040	Transistor, 2SA1015-Y
QS05	A6534040	Transistor, 2SA1015-Y
QS06	A6534040	Transistor, 2SA1015-Y
QS10B	23035308	Screw, BTB3X8SZN
QS10C	23030211	Screw, 3X14SN
QS11	A6342200	Transistor, 2SC2878-A
QS12	A6342200	Transistor, 2SC2878-A
QV05	A6317440	Transistor, 2SC1815-Y
QV06	A6534040	Transistor, 2SA1015-Y
QV09	A6317440	Transistor, 2SC1815-Y
QV10	A6342200	Transistor, 2SC2878-A
QV13	A6317440	Transistor, 2SC1815-Y
QV14	A6317440	Transistor, 2SC1815-Y
QV15	A6342200	Transistor, 2SC2878-A
QV16	A6342200	Transistor, 2SC2878-A
QV17	A6342200	Transistor, 2SC2878-A
QV18	A6342200	Transistor, 2SC2878-A
D241	A7150041	Diode, 1SS104
D302	A7978850	Diode, S5295G
D305	23115532	Diode, ERB12-01RK
D315	A7116715	Diode, Zener, 04AZ7.5Y
D320	A7150258	Diode, 1SS176
D321	A7150258	Diode, 1SS176
D340	A7150258	Diode, 1SS176
D401	A7116925	Diode, Zener, 04AZ9.1Z
D402	A7117215	Diode, Zener, 04AZ12Y
D403	A7117215	Diode, Zener, 04AZ12Y
D405	A7117015	Diode, Zener, 04AZ10Y
D406	A7978855	Diode, S5295J
D408	23118095	Diode, ERB44-06
D410	A7116815	Diode, Zener, 04AZ8.2Y
D591	A7150258	Diode, 1SS176
D592	A7150258	Diode, 1SS176
D593	A7150258	Diode, 1SS176
D594	A7150258	Diode, 1SS176
D595	A7150258	Diode, 1SS176
D596	A7150258	Diode, 1SS176
D597	A7150258	Diode, 1SS176
D598	A7116815	Diode, Zener, 04AZ8.2Y
D599	A7116815	Diode, Zener, 04AZ8.2Y
D670	A7150258	Diode, 1SS176
D671	A7150258	Diode, 1SS176

Location No.	Part No.	Description
D672	A7150258	Diode, 1SS176
D674	A7150258	Diode, 1SS176
D675	A7150258	Diode, 1SS176
D801	23118173	Diode, RBV-406M-LFA
D820	A7978850	Diode, S5295G
D823	A7117305	Diode, Zener, 04AZ13X
D824	A7571020	Diode, TVR5G
D825	A7275400	Diode, 1S2462
D826	A7116315	Diode, Zener, 04AZ5.1Y
D827	A7150258	Diode, 1SS176
D830	23118052	Diode, RU4Z
D832	23118095	Diode, ERB44-06
D834	A7150258	Diode, 1SS176
D838	A7150258	Diode, 1SS176
D839	A7150258	Diode, 1SS176
D840	A7150258	Diode, 1SS176
D842	A7150258	Diode, 1SS176
D843	A7150258	Diode, 1SS176
D844	A7117015	Diode, Zener, 04AZ10Y
D845	A7150258	Diode, 1SS176
D848	A7118115	Diode, Zener, 04AZ30Y
DA02	A7150258	Diode, 1SS176
DA06	A7150258	Diode, 1SS176
DA09	A7150258	Diode, 1SS176
DA10	23115878	Diode, Zener, μPC574J(L)
DA11	A7150258	Diode, 1SS176
DA12	23118426	Diode, Zener, 04AZ4.3Y
DA26	A7150258	Diode, 1SS176
DA27	A7150258	Diode, 1SS176
DA30	A7150258	Diode, 1SS176
DA31	A7150258	Diode, 1SS176
DB01	A7150258	Diode, 1SS176
DB02	A7150258	Diode, 1SS176
DB03	A7150258	Diode, 1SS176
DN01	A7288601	Diode, 1S2186 FA-1
DN06	A7288601	Diode, 1S2186 FA-1
DN07	A7288601	Diode, 1S2186 FA-1
DN11	A7288601	Diode, 1S2186 FA-1
DN21	A7150258	Diode, 1SS176
DS02	A7150258	Diode, 1SS176
DS03	A7150258	Diode, 1SS176
DS04	A7150258	Diode, 1SS176
DS05	A7150258	Diode, 1SS176
DS06	A7150258	Diode, 1SS176
DS07	A7150258	Diode, 1SS176
DS08	A7150258	Diode, 1SS176
DS09	A7150258	Diode, 1SS176
DS11	A7150258	Diode, 1SS176
DS12	A7150258	Diode, 1SS176
DS13	A7150258	Diode, 1SS176
DS14	A7150258	Diode, 1SS176
DS55	A8636650	Diode (LED), TLSG116, S-Red Green
DV05	A7116915	Diode, Zener, 04AZ9.1Y
DV06	A7150258	Diode, 1SS176
DV07	A7150258	Diode, 1SS176

MISCELLANEOUS

B204	23864290	Back Frame
⚠ F801	23144959	Fuse, 3.15A
F801A	23165102	Fuse Holder
⚠ F802	23144125	Fuse, 0.5A
F802A	23165102	Fuse Holder
⚠ F803	23144838	Fuse, 1.0A

Location No.	Part No.	Description
K901	23120370	Remote Sensor, IR-9107-K
L462A	23199308	Compensator, DY, TC-C
L462B	23199314	Compensator, DY, TC-E
L462C	23199482	Compensator, DY, TC-B
P610	23161701	Terminal, 4P
⚠ P801	23176739	Power Cord
PV01	23367724	Connecter, 15P
PV01A	23902655	Connecter, 15P
PV03A	23902654	Connecter, 4P
PV04	23367721	Connecter, 9P
PV04A	23902649	Connecter, 9P
PV10	23365377	Jack, 1S6P
S202	23145682	Switch, Lever, 1C3P
S610	23145411	Switch, Slide, 2C2P
⚠ S801	23145434	Switch, Power, 2C2P
SA01	23145430	Switch, Push, 1C1P
SA02	23145430	Switch, Push, 1C1P
SA03	23145430	Switch, Push, 1C1P
SA04	23145430	Switch, Push, 1C1P
SA05	23145430	Switch, Push, 1C1P
SA06	23145430	Switch, Push, 1C1P
⚠ V901A	23902021	Socket, CRT, 8P
V901M	23102970	Magnet, Purity-Convergence, MAG1015
W201	23250879	Delay Line, TRF2084
W661	23151277	Speaker, SPK-1248, 120x60mm, 8 ohm
W662	23151277	Speaker, SPK-1248, 120x60mm, 8 ohm
X401	23153886	Ceramic Resonator, 503kHz, TCR1012
X501	23153979	Crystal, 4.43MHz
X502	23153797	1H-Delay Line, PAL, ED645A41T
XN01	23153961	Crystal, 3.58MHz
Z101	A5611325	PIF Filter, F1036H
Z240	23107658	Ceramic Video Trap, 5.74MHz, TCF1052
Z241	23107911	Ceramic Video Trap, 5.5 to 6MHz, TCF1019
Z671	23107947	Ceramic Filter, 5.5MHz, SFE5.5MBF
Z672	23107948	Ceramic Filter, 6.0MHz, SFE6.0MBF
Z673	23107949	Ceramic Filter, 6.5MHz, SFE6.5MBF
Z674	23153900	Ceramic Resonator, 500kHz, TCR1010
Z675	23107948	Ceramic Filter, 6.0MHz, SFE6.0MBF
Z676	23107980	Ceramic Filter, 4.5MHz, SFE4.5MB
ZA09	23153741	Ceramic Resonator, TCR1029
ZN01	23107913	Ceramic Video Trap, 6.5MHz, TCF1018
ZN04	23107976	Ceramic Video Trap, 4.5MHz, TPS4.5MC2
ZR01	24000321	Resistor Block, 10k ohmx4, 1/10W
ZR02	24000321	Resistor Block, 10k ohmx4, 1/10W
ZV01	23107849	Ceramic Video Trap, 4.43MHz, TCF1032
ZV02	23107787	Ceramic Video Trap, 3.58MHz, TCF1044

PC BOARD ASSEMBLIES

U902	23336370	Main Board, PW9832
U903A	23336428	Power Board, PW9833-1
U903B	23336373	CRT Drive Board, PW9833-2
U904A	23336425	PIF/SIF Board, PW9834-1
U904B	23336426	System SW. Board, PW9834-2
U904C	23336427	Back Terminal Board, PW9834-3

PICTURE TUBE

⚠ V901	A5544539	Picture Tube, A51KJV93X(VM), SVC

TUNER

H001	23121682	Tuner, EG444A

REMOTE HAND SET PARTS

K902	23120607	Remote Hand Unit, CT-9446
AT01	23304149	Upper Case
AT02	23300919	Lower Case
AT03	23300920	Battery Cover
AT04	23300921	Filter
ST01	23304150	Rubber Sheet
UT01	23336217	PC Board, PW9933
ZT01	23153736	Ceramic Resonator, CSB455EB20

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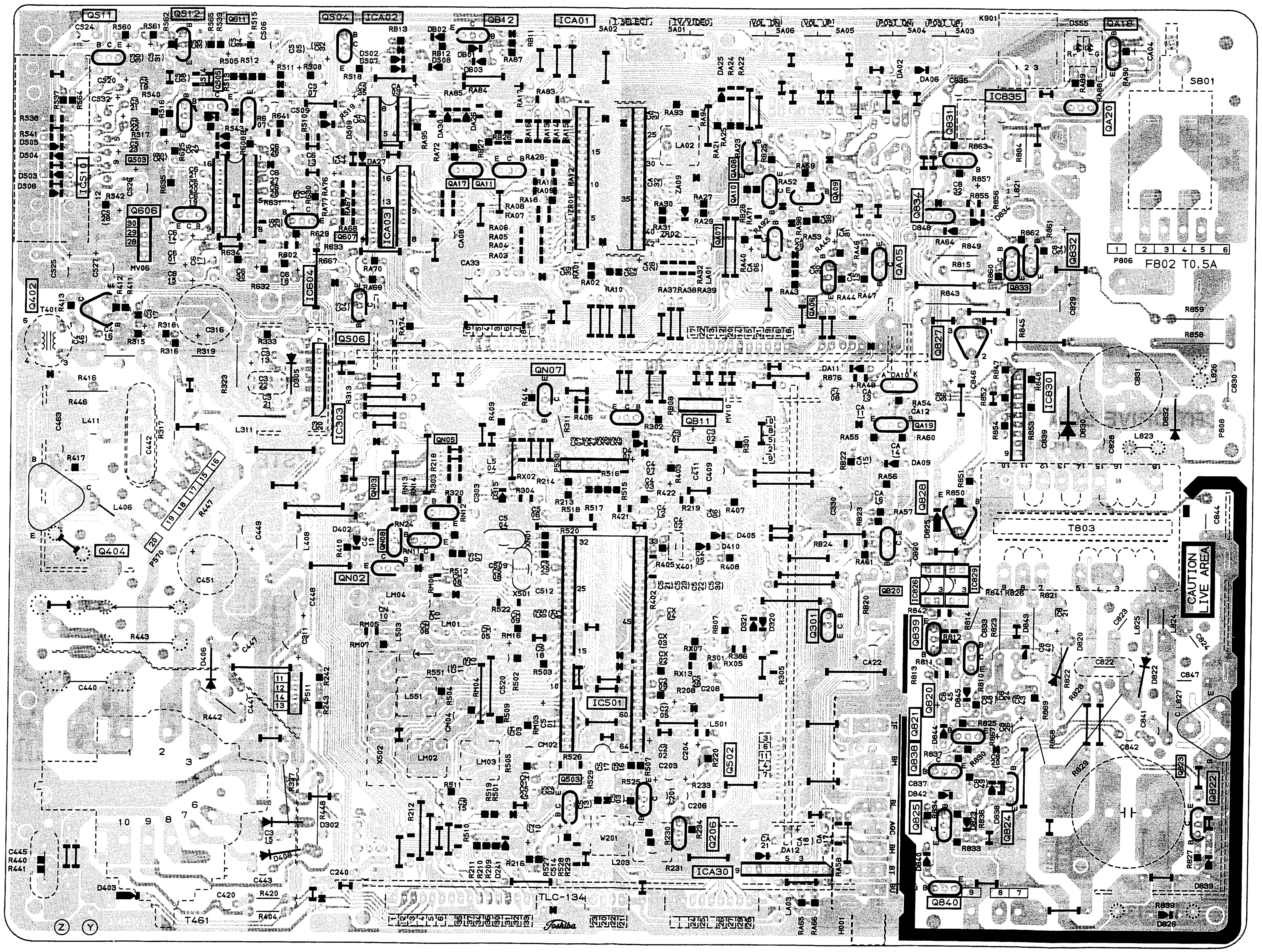
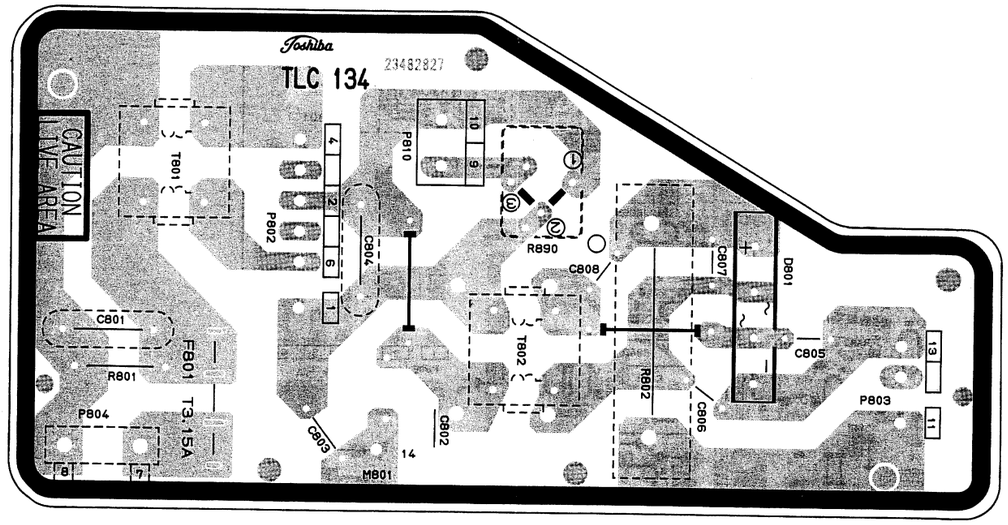
MAIN BOARD PW9832

BOTTOM (FOIL) SIDE



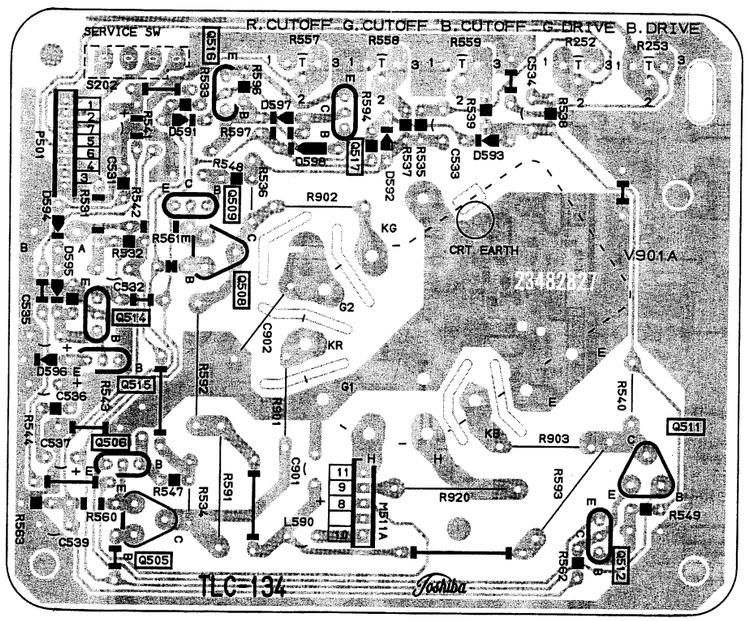
POWER BOARD PW9833-1

BOTTOM (FOIL) SIDE



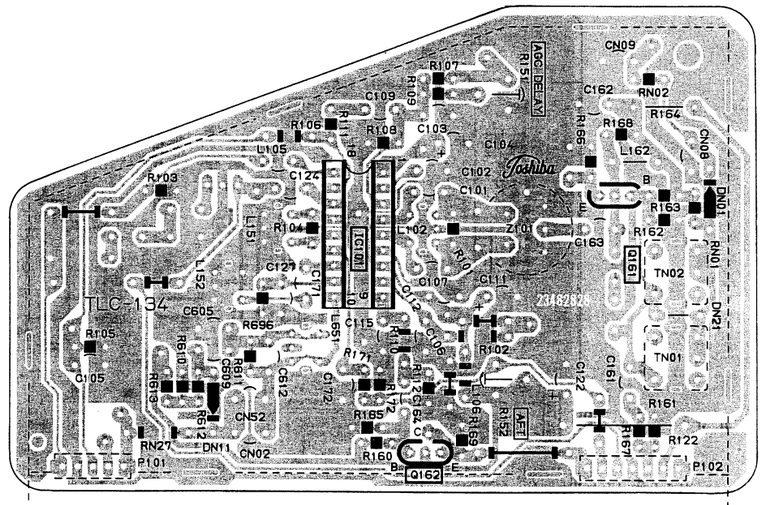
CRT DRIVE BOARD PW9833-2

BOTTOM (FOIL) SIDE



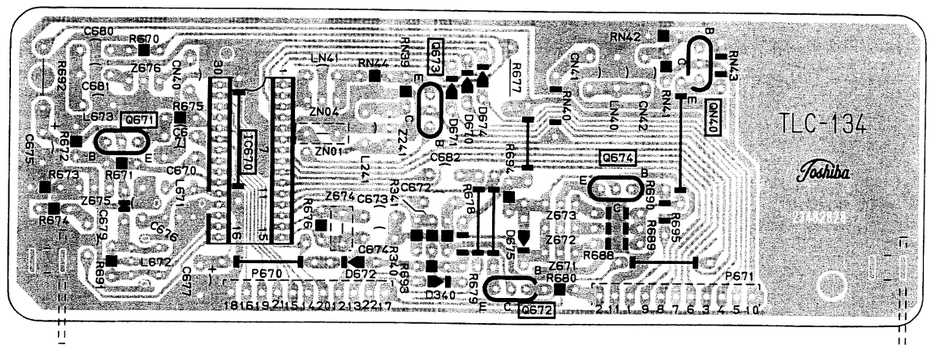
PIF/SIF BOARD PW9834-1

BOTTOM (FOIL) SIDE



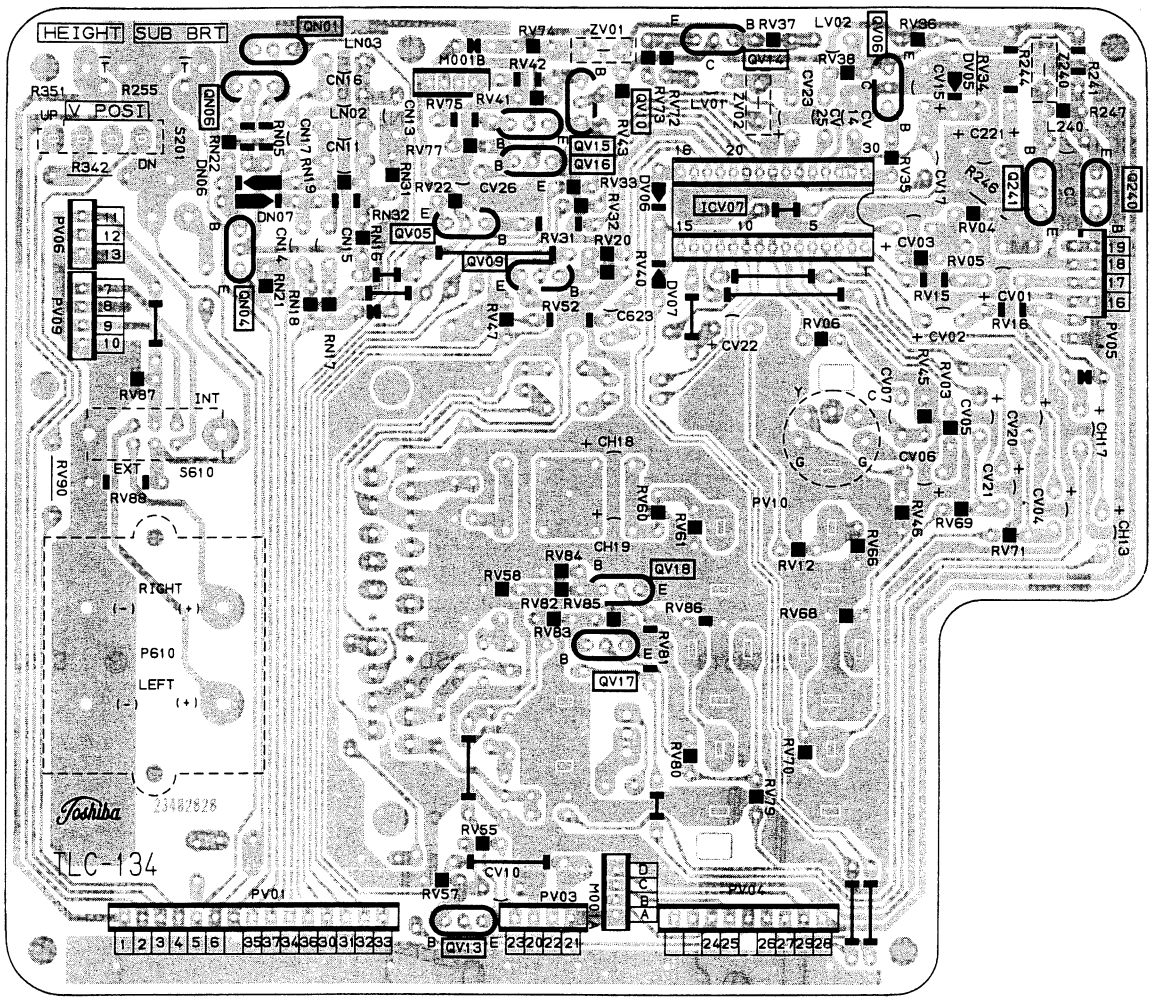
SYSTEM SW BOARD PW9834-2

BOTTOM (FOIL) SIDE



BACK TERMINAL BOARD PW9834-3

BOTTOM (FOIL) SIDE



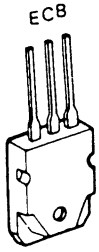
TERMINAL VIEW OF TRANSISTOR, etc.

① 2SA1015
2SC388ATM
2SC1815
2SA562TM
2SC1959
2SC1627
2SC2878
2SC2482
2SA1300
2SC752GTM

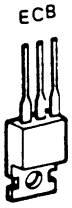
② 2SC2120
2SC2230
2SC2655

③ RN1203
RN1204
RN1205
RN1206
RN2201

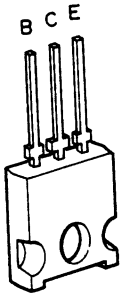
④ 2SA1265N



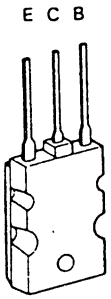
⑤ 2SD553
2SC1569
2SC2383
2SC3148
2SA1012



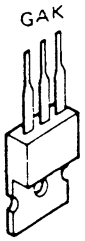
⑥ 2SC3619



⑦ 2SD1427
2SD1428



⑧ SF5J42



(SCR)

MEMO

MEMO

SCHEMATIC DIAGRAM MODEL 219X9M

NOTE: The parts identified by the international hazard symbols are critical for safety. Replace only with part number specified.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chassis ground, line voltage 220 volts, colour bar signal.
2. Voltages reading may vary ±20%.
3. The schematic shown is representative only.
4. All waveforms are taken using a wide band oscilloscope and a low capacity probe
5. Check FINE TUNING, BRIGHTNESS, CONTRAST and COLOUR controls for best picture, make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position.
6. Waveforms are taken using a standard colour bar signal.

NOTES:

1. D.C. resistance valu
gram. These are me
2. The circuits are subj
3. ⬬ : Solder links.

U904B SYS.SW BOARD PW9834-2

U904A PIF/SIF BOARD PW9834-1

U904C BACK TERMINAL BOARD PW9834-3

NOTES:

1. D.C. resistance value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⊖ : Solder links.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.

RESISTOR

Table 1

Type	Mark
Carbon Composition	S
Oxide Metal Film	R
Insulated Carbon Film	P
Wire Wound	W
Cement	No Mark
Variable Resistor	[symbol]
Positive Thermistor	[symbol]
Negative Thermistor	[symbol]
Fusible Resistor	FR

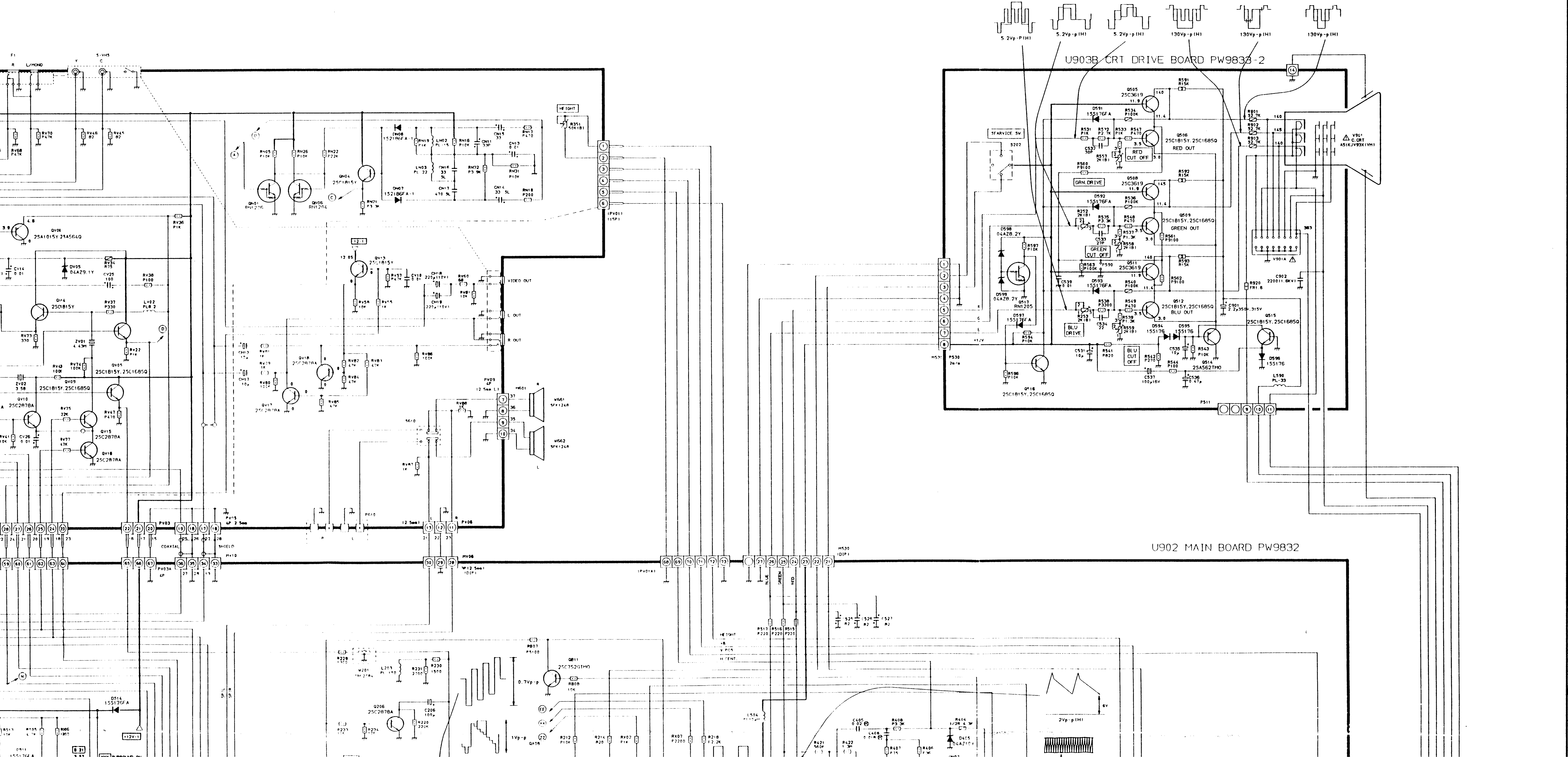
Table 2

Watt	Mark	Watt	Mark
1/6 W	[symbol]	3 W	[symbol 3]
1/8 W	[symbol]	5 W	[symbol 5]
1/4 W	[symbol]	10 W	[symbol 10]
1/2 W	[symbol]	15 W	[symbol 15]
1 W	[symbol 1]	20 W	[symbol 20]
2 W	[symbol 2]	25 W	[symbol 25]

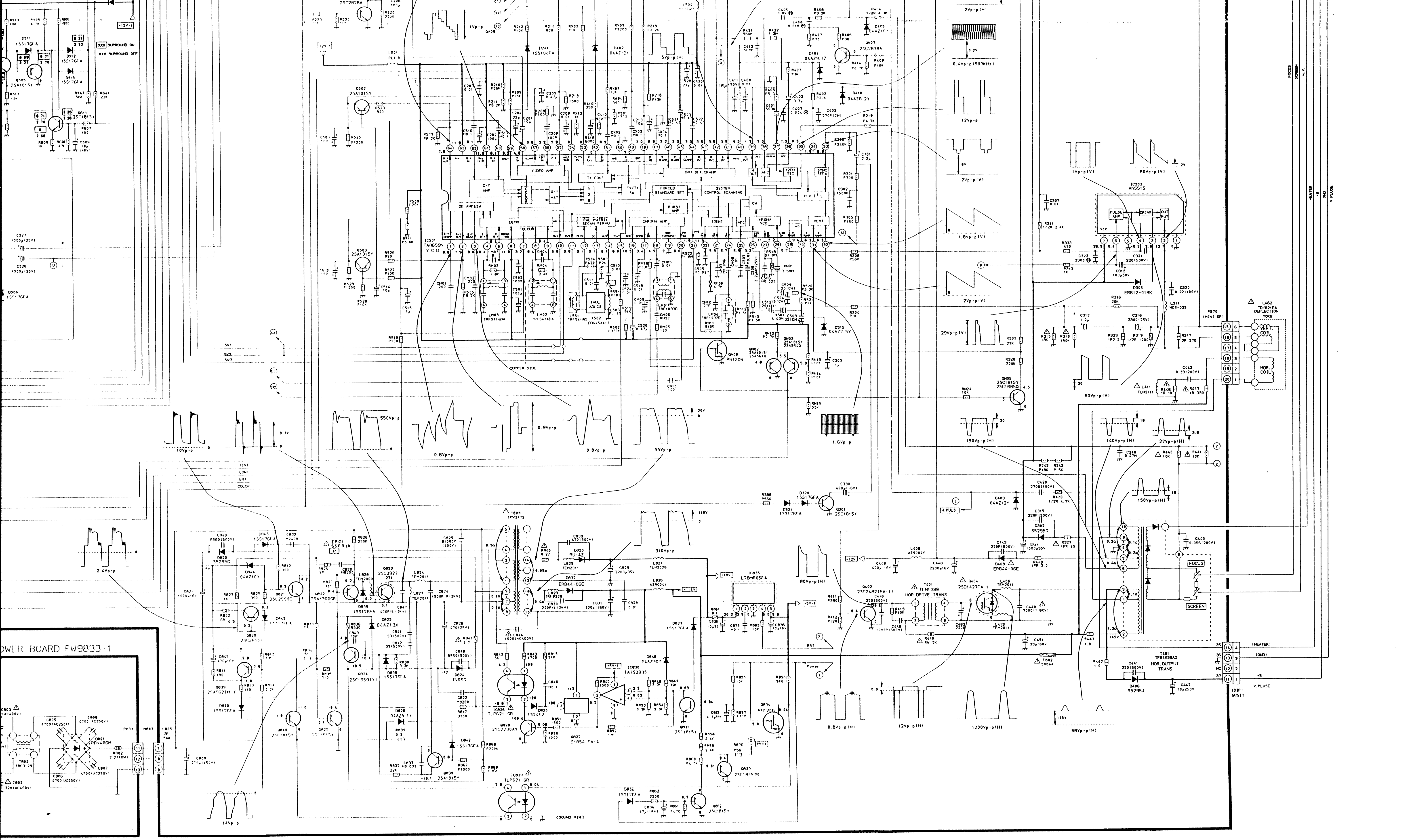
CAPACITOR

Table 3

Type	Mark
Ceramic Disc 50V Only	[symbol]
Electrolitic	[symbol]
Electrolitic Non-Polar	[symbol]
Variable Capacitor	[symbol]
Other	[symbol]



U903A POWER BOARD PW9833-1



OWER BOARD PW9833-1
IC501 TA8659N V C D
VIDEO AMP
C-Y AMP
DE AMP&SW
DEMO
COLOUR
PAL MATRIX SECAM PERAL
CHROMA AMP
FORCED STANDARD SET
SYSTEM CONTROL SCANNING
BRT BLK CRAMP
TX CONT
TV/TX SW
BURST AMP
IDENT
CHROMA VCO
SYNC SEPA
32FH OSC
AFC
VERT
IC303 AN5515
PULSE AMP
DRIVE
OUT PUT
COPPER SIDE
SOUND MIN
TINT
CONT
BRT
COLOR
DEFLECTION YOKE
VERT COIL
HOR COIL
FOCUS
SCREEN
HOR DRIVE TRANS
HOR OUTPUT TRANS
H-PULS
IC835 L78M05FA
IC830 TA75393S
HEATER
V.PLUSE
Power